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THE
EDINBURGH
MEDICAL AND SURGICAL
JOURNAL:

EXHIBITING
A CONCISE VIEW
OF THE
LATEST AND MOST IMPORTANT DISCOVERIES
IN
MEDICINE, SURGERY, AND
PHARMACY.

VOLUME SIXTIETH.
1843.

EDINBURGH:
PRINTED FOR ADAM AND CHARLES BLACK:
LONGMAN, BROWN, GREEN, & LONGMANS, LONDON:
JOHN CUMMING, AND HODGES & SMITH, DUBLIN.

1843.

PRINTED BY STARK AND COMPANY, EDINBURGH.

THE
EDINBURGH
MEDICAL AND SURGICAL JOURNAL.

1. JULY 1843.

PART I.
ORIGINAL COMMUNICATIONS.



ART. I.— *Early Marriages so common in Oriental Countries no proof of early Puberty.* By JOHN ROBERTON, Surgeon, Manchester.

IN two papers on the Natural History of Puberty, published in the Numbers of this Journal for October 1832 and July 1842, I have attempted to prove, in opposition to the generally received opinion, that the age of puberty is as early in the cold as in the tropical regions of the earth; and that, were marriages to take place in England at as juvenile an age as they do in Hindostan, instances of very early fecundity would be as common in England as they are in the latter.

In the papers just mentioned, I have expressed an opinion, that early marriage and early intercourse between the sexes, wherever found generally prevailing, are to be attributed not to any peculiar precocity, but to moral and political degradation, exhibited in ill laws and customs, the enslavement more or less of the women, ignorance of letters, and impure or debasing systems of religion. In proof of this opinion I expect to be able to show that *in England, at a period when some of the unfavourable circumstances just mentioned as yet lingered amongst us, early marriages were very common, if not in all ranks certainly among the gentry; and that such marriages were likewise common very recently among both high and low in Ireland.*

Before entering on the evidence for this curious and hitherto unnoticed fact,—unnoticed I mean in connection with the present subject of inquiry, it may be well to state what is the age of marriage in some European countries, lying, like England, in the tem-

perate zone, and therefore experiencing the same or nearly the same climate, but where the mass of the people, from moral or political causes, and commonly both, are sunk in gross ignorance, or at best, with slow and doubtful progress, emerging from it.

It is to be recollected, that, though I have alluded to Hindostan by way of example, as a land of early marriages, such marriages are found in the coldest climates,—found as commonly among the Esquimaux of North America and the tribes along the shores of Siberia, as on the burning plains of the Carnatic or in the islands of the Indian Ocean,—equally in the inclement Archipelago of Terra del Fuego,* as among the tribes on the Orinoco,—among the Kirgis with their herds of Yaks, in the perpetual snows of Pamir at the fountain of the Oxus,† as in the verdant and sunny island of Ceylon. In every country, supposing the simple means of subsistence easily attainable, and even generally where it is otherwise, if the people are strangers to the Christian Scriptures, or to the civilization of the more favoured European nations, which has its root in the Scriptures, *there* the female sex remains uneducated and unhonoured, bought and sold, or bargained for in some form, like an article of merchandise; and there it is found that generally the marriage union takes place at a premature age. ‡

Spain.—A recent writer has said, “The general immorality of the females is to be attributed to the prevailing system of early marriages—marriages of policy or convenience—and to the low standard of morals, rather than to extraordinary depravity of natural disposition.” “In Spain, women for the most part marry first and love afterwards, and conjugal fidelity is consequently a rare virtue, especially as neither religion nor education interposes to check the fervid passions of a southern clime.” “The cause of the low standard of sexual morals may be referred to the defective system of education, and the want of any proper religious principles to control the ebullition of passions.” “I was amazed

* “The Fuegians marry young.”—*Voyages of the Adventure and Beagle*, Vol. ii. p. 182. Evidence as to the existence of early marriage among the Esquimaux and the Northern Asiatics will be found in my former papers.

† *Journey to the Source of the Oxus in 1836–7–8*, by Lieutenant Wood, p. 340. The Yak cannot live or does not thrive even in the winters of Cabul. It seems to require the region of perpetual snow, from under which it procures its food.

‡ Probably in all countries in an early stage of civilization, it has been the custom to buy and sell wives. By the laws of the Saxon Ethelbert, “if a free man lie with the wife of another free man, let him buy another wife for the injured party.”—*Strutt's Manners and Customs of the People of England*, Vol. i. p. 75. There were laws fixing the price for women of all ranks as wives.—*Ibid.* p. 76. And Michaelis, with reference to Germany, mentions, that, in the German Chronicles of the Middle Ages, “we find it stated that A. B. bought C. D., that is married her.”—*Smith's Translation of Michaelis's Laws of Moses*, Vol. i. p. 450. This subject—the age and terms of the matrimonial contract in different countries, at different periods, has never, as yet, with anything like an adequate degree of care, been investigated, although there are few that better deserve the trouble.

to discover the profound ignorance of the Andaluzas on the most common topics. The fact is, that in Spain woman is still suffering an Oriental degradation. She is still regarded in the light of a being created to contribute to the sensual gratification of man, rather than to be his companion, his friend, his counsellor." *

Sicily.—Frederick von Raumer calls "Ireland the English Sicily," † intimating, that the degraded condition of the people of Sicily is a disgrace to the Neapolitan government, as that of the Irish is a stain on the government of England. It is when speaking of the Sicilians that an interesting writer has said, "One must not enter these huts with English ideas; cleanliness must not be expected, but he will find enough to eat and drink, and the peasants satisfied with what they have. If any proof of what I have said were wanted, it might be found in the *universally* early marriages, and the numerous broods of naked, dirty, but not ill-fed children that are everywhere to be seen." ‡

Greece.—In Mr Strong's valuable statistical work lately published, entitled "Greece as a Kingdom," when treating of the soil and the inhabitants, he alludes to the early union of the sexes, which he seems to attribute to natural precocity, and mentions an Athenian lady who was a grandmother at the age of 24. § Whittman in his *Travels* had given 15 years as about the age when the Greek women marry; || and those of the Ionian Islands, according to another writer, marry some at 11, many at 12, and most before 16; all the matches being made by the parents. ¶

Russia.—European Russia may still perhaps be considered, as to the mass of its population, as lying beyond the boundary of civilized Europe, and here the age of marriage, according to the testimony of a number of writers, is allowed to be extremely early—to have been so, at all events, till within a very recent period. Thus Mr Tooke writes, that the common sort enter into the nuptial state "as early as they can;" and elsewhere remarks that the women arrive at maturity at their 12th or 13th year. **

Another writer has said, that the lords of the soil in Russia, all take care to promote matrimony early. †† According to Archdeacon Coxe, a boy of nine or ten is often married to a woman of more advanced age, she living as his father's concubine. ‡‡ This latter is a curious trait which was noticed by Sir Dudley North, as we learn from his *Letters* during a residence in Archangel as

* A Summer in Andalusia, Vol. ii. pp. 464-5 and 6. London, 1839.

† Italy and the Italians, Vol. ii. p. 355.

‡ Letters on Sicily, by William Irvine, M. D. p. 27. In the Spanish Island, Minorca, the Minorquins "are often betrothed to each other while children and marry at fourteen."—Clegborn on the Epidemic Diseases of Minorca, p. 54.

§ Greece as a Kingdom, by F. Strong, Esq. 8vo.

|| Travels in Turkey, &c. by W. Whittman, M. D. p. 25.

¶ Goodison on the Ionian Islands, p. 322.

** Tooke's Russian Empire, Vol. i. p. 375.

†† Cook's Travels through the Russian Empire, Vol. iv. pp. 70 and 71.

‡‡ Archdeacon Coxe's Travels in Poland, Russia, &c. Vol. i. p. 439.

far back as the reign of Charles II. "One of the inconveniences," says he, "that lie on those who dwell in this country, is, that the people are so given to nastiness, that nothing can be eaten out of their hands; you shall have perhaps four brothers and as many sisters, with their father, mother, husbands, and wives, all dwelling in one hot-house; (*wisbie* they call it;) they have nothing but a little straw strewed on the ground to lie upon." "In this country, the husband is the sole commander of the wife, who differs very little from his servant. Many will marry their sons very young to lusty baggages on purpose to gain able servants." *

From no author I am acquainted with have we in several respects equally precise and valuable information on the customs of Russia, as the Rev. Dr Pinkerton, some time Foreign Agent of the Bible Society, and "many years," he tells us, resident in Russia. Concerning the age of marriage he thus writes, "Before the influx of European customs, the contract for marriage was formed by the parents and relatives, and the bridegroom was never permitted to see his bride until the ceremony of betrothing took place. An ukaz of Peter the Great, in the year 1700, forbade this practice to be continued, and prohibited the priest solemnizing the marriage unless the ukaz was attended to." "At the beginning of the eighteenth century, it was the custom of the Russians of all ranks to marry their children very early even before the age of puberty." †

We shall have again occasion to refer to the Russians in connection with the subject of early marriages: in the meantime I may remark, that, every reader conversant with modern history must be aware that, if we except, to some small extent, the Russians, the inhabitants of the other countries mentioned are degraded politically, morally, and intellectually; the women sought as wives with little regard to a sentiment of affection at an age preposterously early; whilst they, ignorant of the position in the social system they are designed by the Creator to fill, exhibit the vices peculiar to the uncultivated female character—indolence, frivolity, and an abject superstition—with few of its humanizing, purifying virtues. Thus early marriage is found to be the effect of a degraded condition of society, and is again in turn a powerful cause of the perpetuation of that same degraded condition.

If, however, instead of supporting this conclusion, we were to concede, what has been so long and so generally contended for by physiologists, that not ignorance and moral debasement are the causes of early marriage but that it depends upon a bodily cause; that, in fact, the Creator has fitted the women of Andalusia and Greece, for example, to enter upon the duties of wife and mother at an ear-

* Life of Sir Dudley North, in *North's Lives*, Vol. ii. pp. 310-12.

† "Russia; or the Past and Present State of its Inhabitants," by Robert Pinkerton, D. D. pp. 304-306. London, 1833.

lier age than is natural to the women of England, then might the superiority of these latter over the former be considered as a thing absolutely settled ; nor should we be permitted to hope that a purer religion, an improved education, and wiser laws would avail to remove the difference. If it be asked why ? the answer is, that the training of young women, the acquisition of the knowledge and the habits requisite to qualify them for wives requires time—a period at the least of several years subsequently to the age of puberty—if the education is to be anything better than nominal ; and seeing that puberty, on the hypothesis in question, is later in our favoured climate than on the shores of the Mediterranean and the plains of Russia, the women of England, by the ordination of Nature, will possess incalculable advantage in the longer space of time they will have to devote before the period for marriage, to a preparation for the duties of domestic life. This, doubtless, is a conclusion few physiologists would *choose* to arrive at if it could be helped ; but it is one that they cannot evade, except by a supposition which, I am not aware any one has ventured to make, viz. that the women of Spain and Greece, possessing greater quickness of parts than those farther to the north, are able in a briefer space of time to complete their education, the early developement of the body being accompanied by a proportionably precocious display of mind.

The impediment to the work of education arising from the prevalence of early marriage in a community, has not altogether escaped the notice of observers. In a recent tour in Egypt and Candia, Captain Scott, the author, thus writes, and though his remarks have reference to Mahommedans, they are of course applicable wherever the same practice of premature marriage exists.

“ An almost insuperable objection to a finished education in any Mahommedan state,” says this writer, “ is the early age at which marriages are contracted ; a father provides a wife for his son when he ought to be still at school ; so that the youths themselves have the cares and distractions of a family upon them ere they are of an age to be removed from under the rod of the schoolmaster ; and it may be here observed, that precocity of intellect is by no means remarkable among the Arabs ; so their education cannot commence at an earlier age than in northern countries.” *

But by what arguments are the advocates of the hypothesis which I am endeavouring to expose, (that early marriages depend on early puberty, and this latter on warm climate,) to encounter the instance of the Russians in whom this kind of influence of climate at all events cannot be alleged as the cause of *their* early marriages ? I can imagine none. Moreover, there is evidence to prove that, just in that degree in which the light of civilization has, from time to time, found entrance and been diffused in Russia, has the

* Rambles in Egypt and Candia, Vol. ii. p. 183.

practice of early marriage been discouraged and opposed by its rulers. A century and a half ago the inhabitants lay in a state of profound ignorance and debasement—on a level with the nomade hordes of the Asiatic deserts, and it was only when a sovereign like Peter the Great arose, with a clear perception of the better way, with wisdom to take it himself, and courage and perseverance to force his subjects into it, that Russia began to rise in manners, and slowly advance into the rank (as yet perhaps the rear-rank) of civilized nations. It was the custom of the Russians of all conditions, says Dr Pinkerton, “to marry their children very early, even before the age of puberty; but Peter by an ukaz of 23d March 1714, strictly prohibited the nobles from entering the married state before the age of 20 for the bridegroom, and 17 for the bride. Catharine II., by an ukaz in 1775, reduced the legal age of marriage to 17 for the male, and 13 for the female. This custom of early marriage still prevails; and in innumerable instances, especially among the common people, it is fraught with very pernicious consequences, both to the physical and moral state of the parties. Many shocking instances have been known among the peasantry, of a breach of the laws of consanguinity in consequence of these premature marriages. By a recent ukaz of the present Emperor Nicholas, (1831,) the priests are forbidden to solemnize marriage unless the man be 18 and the bride 16 years old: and this edict extends also to the Uniates and Protestants in the Empire.”*

Testimony such as this, concerning the age of marriage in Russia, coming from an eye-witness long conversant with the manners of the people, and a proficient in their language, must be regarded as extremely interesting and valuable. It illustrates the view which I am endeavouring to enforce, as to the causes of early marriage and early sexual union, wherever they are to be found; establishing, by an example on a great scale, that early pubescence, the effect of a warm climate, cannot be regarded as necessarily among those causes.

To proceed to the main object of the present essay: a transition, in some degree resembling the foregoing in Russia, from marriage at a juvenile, to marriage at a more mature age, must have occurred in England; although, owing to greater remoteness of time, the steps of this change in respect to the common people cannot, it is probable, now be traced: with regard to the gentry the case we shall find is otherwise. In entering on this portion of the inquiry, it may be well, since we have the means, to give the age of marriage in England at the present period; by which we shall be enabled to see, in the issue, how great a change time has wrought in this particular among us.

* Past and Present State of Russia, p. 306.

In the Report of the Registrar-General for the year ending 1839, a table of the ages in 4858 marriages has been published, and these not being selected instances, but belonging to districts varying in situation and character, and including every marriage in those districts, may be presumed to be a fair example of the ages at which marriages occur throughout the whole kingdom.

According to this table there were under 15 years, none for either sex ; of males 15, and under 20 years, there were $3\frac{1}{2}$ per cent ; and of females of the same ages about 14 per cent. of the whole number. The average age of marriage was for men, 27 years, and for women 25 years and a few months : a result which still leaves room both for regret and improvement. *

I have already stated that, at the period when premature marriages were frequent in the country, some of those ill customs existed (or customs of like evil consequence) which are found wherever such marriages are found. Independently of the general ignorance, and the rudeness of manners in England in the fifteenth and sixteenth centuries, or even later, concerning which I shall not venture particularly to speak, there was the feudal right of wardship and marriage ; a cause in itself alone of various evils, but of none greater or more hurtful than early marriage, which we shall find it absolutely necessitated in a number of instances ; and thus introducing the practice in high quarters, diffused it probably through the whole mass of society. The nature and exercise of this feudal claim, which existed in all its oppressive rigor so lately as the reigns of the first two Stuarts, having been abolished only in the year 1660, it will be easy to explain and illustrate : in the course of doing which a number of facts will be mentioned indicative of a state of manners whose grossness and barbarism I had not myself an idea of before entering on this course of inquiry.

“ Almost all the real property of this kingdom is by the policy of our laws supposed to be granted by, dependent upon, and holden of some superior lord, by and in consideration of certain services to be rendered to the lord by the tenant or possessor of his property.”†

* Report of the Registrar-General for 1840, page 10, 8vo. From Senior's statement concerning a provision for the poor of foreign nations, 8vo. 1835, we find that in several European countries the laws against early and improvident marriages are, as appears to an Englishman, extremely strict. Thus in Bavaria the clergy are held responsible for the support of those poor persons they have married without leave from the authorities, besides being fined. In Berne no pauper can marry without the consent of his parish ; in Norway no one can marry until he has satisfied the clergyman that he is able to maintain a family : in Mecklenburgh, owing to the conscription and other causes, men marry at from 25 to 30, and the women not much earlier. In Saxony a man liable to serve in the army may not marry under 21 ; in Wurtemberg no man is allowed to marry, unless permission have been especially obtained or purchased, under the age of 25. In Belgium the average age of marriage is for men 27, and 26 for women.

† Christian's edition of Blackstone, Vol. ii. page 59. London, 1809.

All tenures of land were supposed to be derived from the king, either mediately or immediately. Those who held immediately of him were called tenants in chief; and these again in their turn were lords to tenants of a less honourable grade over whom they exercised rights.

The services rendered both by the tenants-in-chief to the sovereign for the lands they held of him, and by the inferior class of tenants to the middle lords in return for their tenures, were various; consisting, among others, of military service, aids, fines, forfeitures, and, what particularly concerns us at present, wardship and marriage.*

The right of wardship means that the lord had the guardianship of his tenant during his minority, by virtue of which right he had both the care of his person, and received to his own use the profits of the estate, excepting the ward's aliment, the amount of which lay much at the mercy of his lord. By a gross abuse of this custom in England, this right of wardship was often by the lord assigned over to strangers, or it was put up to sale, or bequeathed by will like any other kind of disposable property. But, besides the profit of the estate during the minority, the lord had another perquisite connected with his guardianship, viz. the right of disposing of his ward, whether male or female, in matrimony.

Let us suppose a tenant to die, leaving a child or children of both sexes, minors, the lord would assume the powers of guardian,† due inquisition having first been made with reference to the nature and amount of the property, and the ages of the minors; and here it may be well to mention, that the male was a minor till the age of 21, and the female till the age of 14, though in the case of a female ward the law continued the guardian's hold of her person and property two years longer—till she was 16. If the lord did not make over, or sell his rights, he soon set about finding matches for his wards; either by uniting them, if that were thought advantageous, with members of his own family, or of the families of relatives, or by selling the marriage, i. e. if the ward, for example, were a female, disposing of her hand to the best bidder, provided he were of suitable rank, for the law forbade disparagement.

* The kind of tenancy here alluded to was called tenure by chivalry, or tenure by knight service,—in other words, it was a military tenure which in time came to include (or rather in some cases degenerated into) escuage or pecuniary assessment in the room of personal military duty. Socage tenure was a different thing, and did not bring to the tenant the same kind of burdens as tenure by chivalry.

† In law phrase guardian in chivalry. It is a curious circumstance that wardship and marriage is found among the Rajpoots of India. The mother, however, is generally the guardian. Tod's *Rajast'han*, Vol. i. page 161—3.

If any of my readers have a desire to understand fully the nature of this feudal claim I refer them to Hallam's *History of the Middle Ages*, Vol. i.; Sir Henry Spelman's *Posthumous Works*, chap. xiv. and xv., folio 1698; and especially Christian's edition of Blackstone, 4 vols., 15 edition, 1809, Vol. ii. pages 67, 68, 69, 70, 71, 131, and Vol. iii. page 258.

When the female ward was thus married before her twelfth year, she might, on arriving at that age, repudiate the match ; in which case she had to pay to the guardian *the value of the marriage* ; a sum out of her property equal to what a jury would assess as the price which might have been given for the alliance. Of course all wards (I purposely confine my remarks to those of the female sex, though the same would apply with the before-mentioned difference to males) were sure to be made to marry at the latest before the age of 16, since at that age the guardian's power over them ceased, and they were at liberty to sue out their deliverance from wardship. We shall by and by see that marriage, in such cases, instead of being delayed till the age of 15 or 16, or even till the legal age of consent, which was 12, was often contracted at an age considerably earlier, with a view to its being consummated when the parties should arrive at puberty—in some cases probably even before that period.

But it might and often did happen, as has been already mentioned, that the lord, instead of exercising the right of guardian, sold it to a stranger : to use the words of Hargreave, " This guardianship, being deemed more an interest for the profit of the guardian than a trust for the benefit of the ward, was saleable and transferable, like the ordinary subjects of property, to the best bidder ; and if not disposed of was transmissible to the lord's personal representatives. Thus, the custody of the infant's person, as well as the care of her estate, might devolve upon the most perfect stranger to the infant, one prompted by every pecuniary motive to abuse the delicate and important trust of education, without any ties of blood or regard to counteract the temptations of interest ; or any sufficient authority to restrain him from yielding to their influence." *

Before illustrating by instances the strange results of this oppressive and debasing claim, I would remark that our law in a different case appears to proceed on the assumption that early marriages were common : thus Littleton tells us that the wife shall be endowed out of her husband's lands and tenements, " whether she have issue by her husband or no, and of what age soever the wife be, so as she be past the age of nine years at the time of the death of her husband, for she must be above nine years old at the time of the decease of her husband, otherwise she shall not be endowed."† On this passage Sir Edward Coke makes the following comment : " If the wife be past the age of nine years at the time of the death of her husband, she shall be endowed of what age soever her husband be, albeit he were but four years old. Quia junior non potest dotem promereri neque virum sus-

* Hargreave, as quoted by Christian in one of the latter's notes and additions to Blackstone, Vol. ii. page 71.

† Coke's Littleton, lib. i. sect. 36 of Dower.

tenere; nec obstat mulieri petenti minor ætas viri.”* “This we are told by that grave and reverend judge, without any remark of surprise or reprobation,” says Mr Christian indignantly; and then he adds—“It is abundantly clear, both from our law and history, that formerly such early marriages were contracted as in the present times are neither attempted nor thought of.”†

In another instance, the law concerning rape, the existence of very early marriage is indirectly recognized thus;—by the statute of the 18th Elizabeth, which makes it a capital crime to abuse a consenting female child under the age of 10, an exception seems to be left for these marriages, by its being declared that *only the carnal and unlawful knowledge* of such woman-child is felony.‡

It has been already observed that the marriage of a ward was often put up to sale by the guardian. “In the Pipe Rolls of 28, 29, and 30, Henry II., Robert de Were, called son of Robert, son of Harding, accounted for fifty marks, and a golden cup of the value of forty marks, for having the daughter of Robert de Gant in ward.”§

In some cases the sale brought a large, in others a moderate sum: William, Bishop of Ely, gave 220 marks that he might have the custody of Stephen de Beauchamp, and might marry him to whom he pleased. John, Earl of Lincoln, gave Henry III. 3000 marks to have the marriage of Richard de Clare for the benefit of Matilda, his eldest daughter; and Simon de Montford gave the same king 10,000 marks (equal to L. 100,000 at present) to have the custody of the lands and heir of Gilbert de Unfraville with the heir's marriage; and Hugh de Flammerville professed L. 10 for the custody of his sister with her land. In Maddox's History and Antiquities of the Exchequer the reader who is curious will find a lengthy list of sales, such as the above, in chapter X. “of the Crown Revenue.”||

The most curious thing connected with the treatment of this species of property is the extremely cool manner in which wards are bequeathed along with ordinary goods and chattels: thus Sir John Cornwallis, Knight, in his will of date, April 16, 1554, after a very devout and pious exordium, and a specification of certain bequests, proceeds—“I bequeath to my daughter my wife's gown of black velvet; to my son Henry my own gown of tawny taffita; to my son Richard my ward, Margaret Lowthe, which I bought of my Lord of Norfolk, to marry her himself if they both will be so

* Coke's Littleton, lib. i. sect. 36. Of Dover.

† Notes and additions to Blackstone, Vol. ii. page 131.

‡ Christian's notes and additions to Blackstone, Vol. ii. page 132.

§ Berkeley Manuscripts: or Abstracts and Extracts from Symthe's Lives of the Berkeleys, by Thomas Dudley Fosbrooke. 4to, London 1821, page 78.

|| Maddox's History of the Exchequer, folio, London 1711; also Christian's Blackstone, note, Vol. ii. page 71.

contented, but if not I will that he shall have the wardship and marriage of her with all the advantages and profits." *

Sir Reginald Bray, Knight of the Garter, August 4, 1503, bequeaths, among other items of property, two wards, in these terms: "Whereas I have in my keeping Elizabeth and Agnes, daughters and heirs of Henry Lovell, Esq., I will that Elizabeth be married to one of my nephews, son to my brother John Bray, and that the said Agnes to another son of my said brother."†

John Colet, the Dean of St Paul's, August 22, 1519, wills, "all those my lands and tenements, rents, services, *wards, marriages*, reliefs, &c. &c. in the towns, fields, and morasses of Chip-pesby, &c. in the county of Norfolk."‡

Sir Thomas Wyndham, Knight, October 12th, 13 Henry VIII. 1522, bequeaths to certain parties "all my wards and marriages now bought by me, with all advowsons by any means belonging to me, &c. in the counties of Norfolk and Yorkshire."§

It would seem that the dread of wardship and marriage sometimes operated with parents in marrying their child at a tender age, with a view to evade this oppressive law. Thus Maurice, fourth Lord Berkeley, was knighted at 7,|| and was married at 8 years old to Elizabeth, daughter of Hugh, Lord Spencer, then but 8 years old, the reason being that early marriage prevented wardship, the payment of a large fine to the king, and assisted the party's own affairs with interest and powerful connections. This instance happened in the reign of Edward III. From a subsequent entry it is uncertain whether or not the juvenile couple were permitted to cohabit till the age of 16; since at the age of 14 the young husband, it appears, was sent to travel two years in Spain.¶

In my paper in this Journal for July 1842, on the period of puberty in the negro, I have given a number of instances (in a note) of early marriage, chiefly in the families of our kings, up to the date of the marriage of Henry VIII. with Catharine of Aragon. To these I now add some instances which I have gleaned when looking into family memoirs: although not very numerous, they will yet be found sufficient to establish the fact, that the gentry in general, and particularly the eldest sons, married about the age of puberty as late as till the middle of the seventeenth

* *Testamenta vetusta*, being illustrations from Wills of Manners, Customs, &c. from the reign of Henry the Second, to the accession of Queen Elizabeth, by Nicholas Harris Nicholas, Esq., R. 8vo. Vol. ii. page 715. London, 1826.

† Ibid. Vol. ii. page 446. ‡ Ibid. 571. § Ibid. Vol. ii. page 562.

|| If an infant tenant by knight-service was created a knight, the king was no longer entitled to the wardship of his person, nor to the value of his marriage. Christian's Blackstone, Vol. ii. page 67.

¶ Berkeley Manuscripts, page 140—141.

century. The libraries of a provincial town afford little scope comparatively for research in this particular line; but inquirers may possibly be incited by what they find in these pages to pursue the path now opened up, in circumstances more favourable to the elucidation of this trait of old English manners.

1247. John, [eleventh] Earl of Warren and Surry, was married A. D. 1247, when 12 years of age, to Alice, daughter of Hugh de Brun, Earl of the Marches of Aquitaine. *

1303. Robert de Tatershal of Abkettleby, Leicestershire, married while under age Eva, daughter of Robert de Tiptoft, 13 years old. †

1351. The Earl of Holland married Maud, daughter of the Duke of Lancaster, the lady, although a widow, was only 19. ‡

1456. Margaret, wife of Edmund Tudor, was left a widow, and a mother at the age of 14. §

12 Edward IV. We learn from Cotton's Records that it was accorded that, at the age of 13 years, Cicill, only daughter of Katharine, (some time the wife of Bonsile, Lord Harrington,) should marry Thomas, the eldest son of the Queen, "between whom, if there was no mutual society, that the said Cicill should marry with Richard; the brother of the said Thomas." ¶

17 Edward IV. The king creates Richard, his second son, Duke of York and Norfolk, &c., and appoints his said son to marry with Anne, the daughter and heir of John, late Duke of Norfolk, "the said Anne being then of the age of 6 years." ¶

1536. Henry Fitzroy, Duke of Richmond, in Somerset, married to Mary, daughter of the Duke of Norfolk, died, aged 17, July 24, 1536, without issue. **

1532. Elizabeth Leak of Hasland, in Derbyshire, was married at 14 years of age, to Robert Barley, of Barley, Esq., same county, "who was also very young." ††

The mother of Catharine Parr, (the last of Henry VIIIth's wives) Matilda Green, by name, married Sir Thomas Parr when she was 13. Catharine, the daughter, was herself by a family arrangement to have married Lord Scroop when he came to the age of 13, and she to 12. This fell through, but she did marry Lord Borough, a widower, when she could not have been much above 12, since she is found by-and-by to be a widow in her fifteenth year. Again, while as yet under 20, she took for her second husband Lord Latimer.

* Watson's *Lives of the Earls of Warren and Surry*, Vol. i. page 226.

† Nicholls's *History and Antiquities of Leicestershire*, folio, Vol. ii. page 17.

‡ Ibid. Vol. i.

§ Miss Strickland's *Queens of England*, Vol. iv. page 20.

¶ Cotton's *Records in the Tower of London*, folio, page 695.

¶ Ibid, page 702.

** Collins's *Peerage*, Vol. i. page 91.

†† Ibid, Vol. i. page 293.

By a solemn matrimonial treaty, signed at Windsor, the Emperor Charles V. engaged to marry his cousin, the Princess Mary, as soon as she arrived at her 12th year. This treaty fell through; but Cardinal Wolsey endeavoured to effect a marriage between Francis I. and the same Princess Mary, she being then only 11, —neither did this take effect. The fair Geraldine, (of the poet Surrey) a lady of the court of Queen Mary, is married to Sir Anthony Brown when she is 16. *

1551. In certain instructions to the ambassadors in France, of this date, they are directed to inform the French King that, on the 12th October of the next year, Edward VI. would be 14 years old, and to request that the marriage with the lady Elizabeth (daughter of the French King) may take place three months after she shall have attained the age of 12 years.†

1603. James, first Duke of Hamilton, born 1603, married the daughter of the Earl of Denbigh, he 14, and the bride 7. ‡ Burnet says, “after the years for consummating the intended marriage were over he was forced to it not without great aversion, occasioned, partly, by the disproportion of their ages, and partly by some other secret consideration.”

1629. Lord Thurles married his cousin, Elizabeth Preston, (a king's ward,) only child of Richard Earl of Desmond, aged 14.§

A. D. 1667. Lady Dina Russell was married to Sir Grevil Verney when she was aged 15 years.||

1680. Elizabeth, sole heiress of Joseline Percy, Duke of Northumberland, was married to Henry Cavendish, Earl of Ogle, who, however, died before he was of age to cohabit with her. ¶

1663. Elizabeth, Countess of Bridgewater, died this year in the 37th year of her age, having been married at the age of 13.**

These scattered instances of early marriage, gleaned at random from a variety of sources, are not without interest; but a clearer and more precise idea as to the prevalence of this custom in families of rank is obtained when the records of marriage in a particular family in *successive generations* are before us, as in the case of the Berkeleys; from which we shall see that the Lords of Berkeley, some ages ago, differed in this trait of manners little or nothing from the nobles of Russia, in the time of the Empress Catharine, or of her predecessor Peter.

Thomas, fourth Lord Berkeley, was contracted to Margaret,

* These instances are taken from Miss Strickland's *Lives of the Queens of England*, Vol. v.

† Tytler's *England under the reigns of Edward VI. and Mary*, 1839, Vol. i. p. 397.

‡ Burnet's *Lives of the Hamiltons*, folio, page 406.

§ Coates's *Life of the Duke of Ormond*, page 7, 4to.

|| Collins, Vol. i. page 270.

¶ Ibid. Vol. i. page 167.

** Ibid. Vol. ii. page 365.

daughter of Gerard Warren, Lord Lisle [41 Edward III.] Amongst other items in the contract is this, "The same Margaret by reason of her tender age, (then about 7,) shall for *four* years remain with her father, and this Thomas de Berkeley with his father." * Elizabeth, only daughter and heir of the aforesaid Lord Thomas Berkeley, was contracted for marriage when she was under 7 years of age; the husband Richard the Earl of Warwick. It may be presumed that the consummation of the marriage would take place about the age of puberty. † Thomas, son of William Marquis Berkeley, [Edward IV.] when 5 years old, was contracted by his father to Mary, daughter of Anne, Countess of Pembroke. ‡ Maurice, fourth Lord Berkeley, (whose case has been already mentioned) married at 8, his wife being of the same age. Maurice, sixth Lord Berkeley, 8 Henry VIII., "bought of the King the wardship of the body and lands of John, son and heir of Sir Richard Berkeley of Stoke; and, by his will, directed that he should be married at 16 years of age to Isabele Dennys, his sister's daughter; and if she should refuse, to Helen her sister, and so to Margaret her sister." § Lady Catharine, a daughter of the Earl of Surry, was married at 16 years of age to one of the Berkeleys, "by the bedside of her grandfather, the Duke of Norfolk, as he lay in his bed, then grown weak with age and sickness." || George, Lord Berkeley, [12 James I.,] was married to Elizabeth, second daughter and co-heir of Sir Nicholas Stanhope in the church of Great St Bartholomew, London, and, in the presence of both their parents, he being 13 years old and she 9. It appears that the bridegroom was sent to Christ Church, Oxford, to study for a time, his wife remaining with her father. ¶ What remains, though out of place as to date, is the most curious piece of information of any. Maurice, third Lord Berkeley, [Edward I.] was married at 8 years old, and a father before he was 14. The historian adds, "more than a dozen instances of paternity occur before that age." **

More than a dozen instances of paternity occur, such are the words of the author of the *Lives of the Berkeleys*, before the age of 14. What an insight does such a sentence afford into the condition of families in the fifteenth, sixteenth, and seventeenth centuries, when this detestable precocity was unblushingly encouraged; assimilating the people of a Christian country, in this revolting feature, to the Pagan inhabitants of the South Sea Islands: regarding whom, the Rev. Mr Ellis informs me, that the union of the sexes is *never*, he believes, delayed so late as the period of puberty. It must have been a full acquaintance with, and strong perception of the evils of this nature, resulting from ward-

* Berkeley Manuscripts, page 143.

† Ibid. page 162.

‡ Ibid. page 217.

§ Ibid. page 176.

** Ibid. page 115.

† Ibid. page 148.

‡ Ibid. page 205.

ship and marriage, which could have drawn from Grafton, a faithful chronicler in the reign of Elizabeth, the following extremely curious display of humane and patriotic feeling.

"It is much lamented that wards are bought and sold as commonly as are beasts; and marriages are made with them that are many times very ungodly; for divers of them being of young and tender years, are forced to judge by another man's affection, to see with another man's eye, and say yea with another man's tongue, and finally consent with another man's heart. For none of these senses be perfected to the parties in that minority, and so the election being unfree, and the years unripe, each of them, almost of necessity, must hate the other, whom yet they have had no judgement to love. And certainly the common bargaining and selling of them is to be abhorred, besides the shameful polling that many use, which, if they consent not to such as are their sellers, they shall be handled, as the common saying is, *like wards*, and stripped almost out of all they have, when the same should do them most good. God grant the magistrates may take some good order therein, for surely it is needful, for many do use them as the same is not sufferable in a Christian realm. For who seeith not daily what innumerable inconveniences, divorces, yea and some murders, have of such marriages (or rather no marriages) proceeded, the present time sheweth too many examples, which minister sufficient cause for us bewail the same; but the greatest injury is to God, who hath made that free, namely, matrimony, which the law of this realm maketh bond; the redress whereof belongeth only to the Prince, in whom, like as the same God hath caused more virtues to meet than in any other creature of her calling, so we doubt not, but that his Godhead will, when his good pleasure shall be vouchsafed, not only to preserve her Highness, with the increase of virtue and wisdom, but also to move her heart to the godly redress of these, and many other enormities and abuses, to the great comfort of all her Grace's loving and obedient subjects."*

Ireland, placed on the western verge of Europe, and never included within the bounds of the Roman Empire, from its remote position, was comparatively little exposed to those early migrations of energetic races from the north-east, by which nearly every other European country was at different periods visited, and by which the inhabitants were either extirpated, or renovated and improved. In this respect Ireland has undergone little change when compared with the island of Great Britain, and hence, (for reasons which will be obvious to the student of history, but which it is foreign to my present object to dilate upon,) it wears the traces of a somewhat recent civilization. The population in some of the remoter districts having, even at the present day, a resemblance in the

* Grafton's Chronicle, Vol. ii. pp. 249-250. London.

depressed cranium, and strongly marked developement of the bones of the face, to the rudest varieties of our species.

Amongst those evidences of a low state of moral advancement which might be mentioned, *that* supplied by the early age at which the sexes unite in marriage is not wanting, as we learn from various writers on the social condition of Ireland. To Dr Griffin of Limerick, in the first place, we are indebted for an interesting table, exhibiting the ages at which 735 women of that city married. Of this number there were, at 13 years of age, four; at 14 years, seven; at 15 years, twenty; at 16, fifty; at 17, forty-eight; at 18, sixty-eight; at 19, seventy-two; at 20, eighty-three, being at the rate of about 50 per cent. married under age; whereas in England the highest per centage of women marrying under age is 25.19 per cent: this is in the county of Bedford. In North Wales it is only 7.89 per cent.*

"The extremely early age at which many of these marriages took place," says Dr Griffin, "will no doubt surprise people very much. I have reason to think they are not very incorrect; and those which occurred at the very early ages stated were always strictly inquired into. Of the four females stated to have been married at 13, two are well authenticated instances which occurred in the county; one of these had her first child at 14. The other two took place in the city, and were actually not quite 13 at the time of marriage. In one of these instances, when I said to the mother, 'this girl must have been exceedingly anxious to get married, to marry so very young,' she replied, 'Oh! no Sir, she knew nothing about marriage, or what belonged to it, but the priest sent her away three times, he thought her so young.' In general, I believe these early unions are brought about entirely by the parents."†

Mr Edward Wakefield, in his Statistical and Political Account of Ireland, published in the year 1812, has furnished a good deal of curious information concerning social life in that country, and animadverts with severity on the early improvident marriages of both the lower and upper classes. He says, that "celibacy being unfashionable, domestic servants are generally married;" that the Roman Catholic peasant marries "in the greenness of youth, when reason seldom interrupts his career, and asks him whether he may not bring into the world a progeny for whom he cannot find the means of support. Thus a voluntary submission to the lowest state of life, and a disrelish for superior comforts, having become habitual, the system of premature marriage is perpetuated, while the increase of numbers is an unchecked increase of misery."

* Fourth Annual Report of the Registrar-General of Births, Deaths, and Marriages in England, for 1842, containing very interesting tables concerning the ages of 40,874 persons married in the 5 years. June 1841, folio, p. 8.

† Journal of the Statistical Society of London, Vol. iii. pp. 322-3.

He represents the condition of women of the lower ranks as degraded in the extreme, that the man considers his wife as his slave; and that females are treated more like beasts of burden than rational beings; owing to which the traces of youth rapidly fade away. "In consequence of this harsh treatment, and continual exposure to the weather, added to the smoke of their cabins, and scanty fare, they exhibit a miserable spectacle, and acquire, at a very early period, every mark of old age. I have seen women who, from their appearance, might be supposed to be past the time of child-bearing followed by very young children, whom I did not consider as their own; but on inquiry, I found I was mistaken, and that their mothers were not above 30 years of age."

Mr Wakefield asserts that young ladies in the higher classes "generally enter into the married state between the ages of 16 and 19;" that match-making in this rank of life is universal; that eighteen out of twenty marry the moment their mothers inform them that suitable offers have been made; and that, as might be expected, there is much deficiency in such youthful wives, both with respect to mental cultivation, and a competent knowledge of house-keeping.*

Perhaps the facts which have now been presented may be thought to warrant the following conclusions.

1st, That in England, Germany, and Protestant Europe in general, early marriage—that is, marriage about the age of puberty, would seem to be comparatively rare.

2d, That early marriage prevails amongst the uncivilized tribes, which wander within the Arctic Circle; as it likewise does in all cold countries, without any exception, the inhabitants of which are in a state of ignorance and moral degradation.

3d, That throughout European Russia, which is confessedly low in civilization, extremely premature marriage was the universal custom at no distant date.

4th, That, at the present day, in the most southerly countries

* An Account of Ireland, Statistical and Political, 4to, Vol. ii. pp. 578, 579, 801, 802, 797, 799. From Mr Crofton Crocker we learn, that courtships are generally commenced among the peasantry of the south of Ireland "soon after the parties attain their teens." See his work on the South of Ireland, 4to, pp. 234-236. See also Letters from the Highlands of Cunnemara, 1825, by a Family Party, p. 96. Whilst I am writing this paper, I observe in the London Times of February 1st 1843, a notice issued by an Irish landlord to his tenants, warning them against the practice of early marriage. "Is it possible for parents to shut their eyes, says this gentleman, to the consequences of it, which they must daily witness in producing poverty and wretchedness around them? Yet, they permit their young married children to take their abode under the same roof with themselves, and thus give encouragement to hasty and improvident marriages, thereby impoverishing the entire family." The landlord proceeds to threaten such tenants as turn a deaf ear to this word of advice, with expulsion from his estate. The above notice is copied into the Times from Freeman's Journal, but the name of the philosophical landlord is prudently withheld.

of Europe, where the people are immersed in superstition and ignorance, marriage is early.

5th, That in Ireland, which, as to its moral condition, somewhat resembles the last mentioned countries, the marriage union takes place among the Roman Catholic population at an age probably almost as early.

6th, That in England about two centuries ago, when debasing political and social circumstances combined to favour the practice, early marriages were general, at all events in the upper ranks.

7th, That in all the countries to which reference has been made, juvenile marriage is invariably seen as an attendant on ignorance and moral debasement, and this without reference to CLIMATE.

8th, That consequently it is perhaps allowable to infer that early marriage in oriental countries (which has generally, in the absence of all proof whatever, been ascribed to precocious puberty,) does solely depend on the same moral and political causes as elsewhere produce it; more especially as those very causes are well known to exist, at present, in an aggravated degree in all oriental and intertropical countries.

9th, That, instead of ascribing early marriage, so prevalent in our Asiatic dominions, to precocious puberty, (in the absence of all evidence whatever of the fact,) it would be desirable to try moral and legislative remedies, with a view to the removal of a practice so injurious; a practice which seems to be incompatible with social improvement.

ART. II.—*The Condition of the Blood in the Veins in the natural and the disturbed states of the Animal System.*

By G. CALVERT HOLLAND, M. D., Physician to the Sheffield General Infirmary. (Concluded from Vol. lix. p. 271.)

INQUIRY III.—*The causes of the variety of tension in the Veins.*

IN the preceding researches, we have endeavoured to prove that the experiments of physiologists do not establish the direct impulse of the heart on venous blood. The evidence which they present may be adduced in refutation of the opinion, and with so much force, that it is difficult to explain the prevalence of it. The difference in the tension of arteries and veins has always been regarded as rendering the phenomena of circulation exceedingly abstruse and embarrassing. The one class of vessels is admitted by all to be distended, and the other to be flaccid, hence capable of receiving a much greater quantity of blood than they ever possess in health. There are, also, other important distinctions. The one reacts on the vital fluid, the other can scarcely be sup-

posed to exert any particular influence. The reaction of the arteries is attributable to previous distension, and the momentary cessation of the cause which produced it. The circulation in the veins, according to the description of Magendie, is slow and equable, not exhibiting the synchronous impulses of the heart; consequently, the veins are not one instant dilated, and the next contracted. The addition to the arteries is not only made at times corresponding with the systole of the left ventricle, but in considerable quantity. That to the veins, even on the views of Magendie, is made up by finely attenuated currents, or strings of globules, moving irregularly forward. The two systems of vessels are obviously very differently circumstanced. Reaction, in the one, is, to a certain degree, an inevitable effect; in the other, it is scarcely possible to imagine the agency of such a power. The tension in the veins is referred entirely to the pressure of the arterial column. No obstacles are conceived to exist between the two systems of vessels capable of intercepting the force *a-tergo*. If the dilatation of the right auricle be the cause of the diminished tension in the veins, its influence can be exerted only when it acts. We will suppose a system of inert vessels, having the capacity of the arteries and veins, and connected by exceedingly small tubes, offering no resistance to the pressure from behind, so that the tendency of it will clearly be to establish an equality of tension. Whether those representing the veins be ten or fifty times more numerous than those bearing the relation of arteries to them, does not at all affect the hydrostatic principle. Into the latter, a fluid is injected at regular successive periods, and from the former, a proportionate quantity is expelled. If the whole series of vessels be imagined full, and an ounce and a half be added at one extremity of the system, an equal quantity will be displaced from the other. If the vessels are not full, the fluid will of course accumulate until they are filled, and then the escape and introduction of fluid will be synchronous in time, and proportionate in quantity. We will conceive, connected with this system of tubes, an apparatus, by means of which an intermittent is converted into a continued stream, so that the fluid is in constant motion. This modification in the system of inert vessels does not interfere with the equalization of pressure. The force momentarily lost in compressing a reservoir of air is immediately restored by its reaction. The quantity of fluid escaping from one class of these vessels will be exactly proportionate, in equal times, to that which enters the other; and no continued stream could be kept up, unless both were full.

Were a valve placed at the end of the large tube, supposed to represent the *vena cava*, and opened only at times, corresponding with the impulses of the piston, reaction of the reservoir could

not take place in the interval. The exercise of this power requires a ready escape for the fluid at all times. The condition into which the reservoir is put, in this imaginary case, arises from the piston expelling, in the first instance, a less quantity than it adds. This disproportion in the two quantities is quickly corrected, and then the reservoir remains permanently compressed, exerting no more influence on the fluid than would a mere bulging of any of the tubes.

The vessels in the animal system are not thus circumstanced. The blood is continuous in its motion, and the apparatus by which this is effected is very different from the one described. The tension in the arteries, according to prevailing views, can vary little in the systole and diastole of the heart. Though momentarily distended by the former, reaction in them is calculated to maintain a corresponding condition; hence an uninterrupted pressure is urging the blood towards the capillaries. The dilatation of the right auricle removes from the extremity of the venous column an ounce and a half; consequently, in the subsequent contraction, diminished tension exists in this situation. It is a principle that compressed fluids will rush in every direction until an equilibrium of pressure be established. Accordingly, the venous blood will at once flow towards the right auricle, while contracting. We cannot suppose that the space will only be partially occupied. The loss of the small quantity of fluid transmitted forward will be fully compensated in the time required for its removal. At this moment the elastic contractility of the arteries is said by Magendie, Poiseuille, and others, to force the blood in this direction: the effect which is here insisted upon is therefore inevitable. A diminution in the tension of the *vena cava* will be felt by the complicated series of venous tubes. A cause which influences the whole cannot be regarded as the agent of partial results. According to this reasoning, the venous system has two periods in which different degrees of tension exist, and both equally universal; one during the contraction of the right auricle, the other during its dilatation. The veins, however, throughout the body are as flaccid in the one state of the auricle as in the other. Were these vessels full, and kept in this condition by the pressure of the arterial column, equal to sixty-four pounds, the removal of an ounce and a-half of blood would affect only momentarily the venous tension.

But, even on the arguments of these physiologists, it may be shown that the direct impulse of the left ventricle is not transmitted to the venous column. Were it indeed to urge this forward, accumulation of blood and cessation of circulation would occur. The reaction of the arteries, coexisting with the contraction of the right auricle, forces the blood into the *vena cava*, to supply the loss oc-

caused by the previous dilatation of this cavity. Were the influence of the left ventricle, also, subsequently transmitted to the venous column, a greater quantity of blood would be determined to the right side of the heart than could possibly be removed. The diminution of tension in this situation occurs when this ventricle is dilating, at which time the venous column is imagined to be moved forward, by the reaction of the arteries, to furnish to the auricle, in its next dilatation, the required quantity of fluid. Were the contraction of the left ventricle to send an additional quantity, there would clearly be two causes in operation, each of which is sufficient to supply the necessities of the right auricle. It may, perhaps, be contended, that the quantity supplied and urged forward by the ventricle is essential to maintain the balance of circulation between the two systems. This is undoubted. The quantity of blood removed from one end of the column must be furnished by the other, but this may be as accurately accomplished by the capillaries, as by the direct impulse of the heart. This question is indeed very different from the one under consideration.

A few remarks will render our views on this subject more clear. The first step essential to the understanding of it, is to keep in mind the prevailing doctrine of the physiologists, respecting the motion of blood in arteries. Two causes, acting consecutively, are insisted upon, the impulse of the left ventricle, and the elasticity of the arteries. The left ventricle contracts when the right auricle is dilating, so that, agreeably to received notions, this impulse, acting on the arterial column, will urge forward a quantity of venous blood adequate to the coexisting wants of the right auricle. It is scarcely possible to deny this, when it is considered that the dilatation of the auricle, by the diminution of tension at the venous extremity, facilitates the flow of blood. If we suppose an ounce and a half to be removed by the dilatation of the cavity, during the subsequent contraction of it, this amount of loss will be compensated by the reaction of the arteries, the second propulsive power brought into play when the left ventricle is dilating.

What is to prevent this second power establishing an equilibrium of tension, that is, transmitting into the venous system the ounce and a half of blood removed by the dilatation of the right auricle? To question the fact, is to argue that a fluid in motion will not flow where it meets with the least resistance.

The doctrine which we are here combating derives the whole of its plausibility from the supposition, that the force of the left ventricle is expended in two directions, the one in urging the arterial column forward, the other in dilating the arteries; so that the original propulsive cause is divided into two halves, which conjointly send into the venous system the ounce and a half of blood removed by the dilatation of the right auricle. A brief ana-

lysis of this opinion will at once expose the absurdity of it. When the left ventricle contracts, the coexisting dilatation of the right auricle not only allows, but facilitates, the flow of blood in such direction; and it would be strange, indeed, reasoning on the views of Magendie, if the venous column were not at this moment urged forward, to establish an equality of tension in the venous system. To argue otherwise is at variance with the most obvious and unquestionable hydrostatic principles.

If the dilatation of the auricle remove an ounce and a half of blood; during the subsequent contraction of it, the arteries, the second propulsive power, are then returning upon their contents, with the force originally expended in the dilatation of them; and what is to prevent this power establishing an equality of tension in the venous system, imagined to be disturbed, by the removal of an ounce and a half of blood from the venous extremity?

To apprehend the arguments which are here employed, to appreciate the full force of them, the reader must keep in mind the doctrine of Magendie, and physiologists generally, viz. that the force of the left ventricle pushes forward, at every contraction, the venous column, precisely as the piston in a syringe does the contained fluid,* and, in the animal system, this action occurs when the right auricle is dilating, thereby allowing an uninterrupted course to the forward rush of the blood.

At the next moment, when the right auricle contracts, to expel the ounce and a half of blood, the arteries are then reacting; and, if there be any diminution of tension at the venous extremity, from the removal of that quantity of blood, will not the arteries instantaneously supply the amount? This conclusion is indeed inevitable, from the purely physical views of physiologists.

Magendie states that the pressure in the veins is not the same in any two. The variety is certainly not explicable on hydrostatic principles. If fluids find their level when compressed, the blood will be no exception to the law. In treating of the different results furnished by the hemadynamometer, he alludes to the influence of the numerous anastomoses of the veins. This, however, can be no cause in the undisturbed condition of the animal system. Whether the veins have 50 or 500 branches cannot affect the principles regulating the distribution of fluids. The pressure must be universally the same, whether the cause be the impulse of the heart, or the contraction of the arteries.

Whether the anastomosing vessels be 50 or 500, they are necessarily in the same condition. To argue otherwise, is equivalent to asserting, that some of these vessels are only partially filled, while others are in a state of distension, which manifestly would be an absurdity. To perceive the full force of the objec-

* See *Leçons sur les Phénomènes Physiques de la Vie*, Tome iii. p. 137.

tion, let the inquirer simply ask what are the imagined causes of venous tension? The answer will be, the heart and the contractility of the arteries. To contend that either of these causes produces a different degree in each vein, is not less strange than the doctrine would be, that the stroke of the piston occasions a variety of tension in the several tubes through which the fluid is propelled. To diminish that at the extremity of the venous column, is to affect equally the whole of the venous system. The cause in this instance is not less general than the heart or the arteries, and consequently it would be unphilosophical to expect partial results. In these remarks the object has been to show that, according to the received views, the blood removed by the dilatation of the right auricle is immediately compensated by the ascent of the venous column, not from the direct impulse of the heart, but from the pressure of the arterial column; hence the force of the left ventricle cannot be required to extend its influence to this distant point.

The connection between the two columns of blood is imagined to be the same as exists between the two columns in the supposed apparatus of inert tubes, and is regarded as established by the same fact, viz. if fluid be injected into one series of vessels, it must be expelled from the other. This is certainly the case with the apparatus, and in the animal system, the quantity furnished by the left ventricle is removed by the dilatation of the auricle. Both cases are in this respect analogous, and appear to rest on the same evidence. There is danger, however, in analogy, and especially when traced in phenomena originating in very different causes, and influenced by very different circumstances. The two columns in the animal system are connected, but not in the same manner as in the apparatus in question. The capillaries absorb and propel blood when the heart has ceased to contract, or its influence is altogether interrupted. Were the action of the piston to be arrested, the fluid in the descending limb of the apparatus would not be drawn by intermediate tubes into the ascending and corresponding limb and expelled. It would remain at rest. There is a marked and important distinction in the properties of the minute and intermediate vessels connecting the two columns in both cases. In the one, there is evidently a cause in operation sufficiently active to convey forward the fluid into the ascending vein; in the other no such cause exists. Here then the analogy in the condition and functions of the vessels uniting these columns entirely disappears. There is another striking peculiarity. However small the quantity of fluid injected by the piston, a proportionate quantity is emitted. Accumulation is impossible. Now, the quantity of blood sent into the aorta by the impulse of the left ventricle is not necessarily removed by the dilatation of the right

auricle. The two cavities will always have a corresponding number of contractions, but not an invariable relation in the quantity expelled and received in a series of consecutive actions.

The consideration of this peculiarity opens a wide and interesting field of inquiry. Were the right side of the heart always to remove what the left transmits, congestion would never take place. This, in fact, arises from the inequality in the action of the two cavities, and strongly marks the difference between the motion of fluid in inert and organized vessels.

Were venous circulation dependent on the impulse of the left ventricle, is it not extraordinary that this impulse should allow blood to stagnate in its natural channels? If the weight of the arterial column is alone sufficient to raise the venous to the heart, the additional force of sixty-four pounds acting equally in all directions would surely prevent the accumulation of blood in the veins. The phenomenon can only be accounted for on the supposition, that the combined propulsive powers are inadequate to move the venous column, or that its condition depends on the influence of the capillaries. Either supposition is unfavourable to the prevailing views of physiologists. If the direct impulse of the heart be the cause of venous circulation, here is clearly an instance in which it is incapable of urging the blood forward. According to these views, as long as the congestion exists, the impulse is directed against the interrupted columns, but in vain. Whatever may be the amount of the *vis-a-tergo*, it is evident that accumulations occur which this is inadequate to overcome, and remain stagnant until affected by local remedies or constitutional changes. These are facts of peculiar value in this inquiry. Both the congestion and its removal indicate the operation of powers which cannot be attributed to the heart. The piston cannot cause an unequal distribution of fluid, nor can the heart either produce this or correct such condition.

These are effects inexplicable on the views which are here combated. The phenomena admit only of one explanation, viz. the independence of capillary circulation on the direct impulse of the heart. The blood accumulates in defiance of the immense force which is said to give it motion, and the subsequent equable distribution of it takes place from changes in the capillary vessels, and not from any modification in the character or direction of the ventricular impulse. These facts demonstrate that the right and left cavities of the heart, though synchronous in their respective actions, do not always correspond in the quantity of blood received and transmitted by them. Congestion occurs when the left side conveys into the circulatory system a greater amount than is removed by the right, and it is dissipated only by the subsequent preponderating activity of the latter. This irregular or unequal action in

the cavities of the heart, shows that the proposition which is usually laid down, in regard to their perfect harmony, cannot possibly be adopted. The strict relation supposed to exist between them is frequently and seriously disturbed. No further argument is required to prove the want of analogy between the circulation of blood and the motion of fluid in inert tubes.

It is not difficult to explain the seeming uniformity in the quantities of blood propelled and received by the right and left cavities of the heart, nor the occasional inequalities exhibited. The phenomena are satisfactorily accounted for on the functions of the capillaries. The various organs of the body are not supplied, even in health, with an invariable quantity of blood. There is scarcely one which has not its periods of activity;—the brain, during the intellectual exertions of the day,—the digestive apparatus, after the reception of food,—the generative system, during its important modifications. The quantity of blood required is always proportionate to the energy of the individual functions; hence the distribution of it is constantly varying in different parts of the animal system. These particular changes are not occasioned by the impulse of the heart. This is incapable of producing partial effects. The capillaries draw from the general sanguiferous system the necessary supply, and this varies according to the urgency of the local wants. Severe and long-continued mental exertions cause an excited cerebral circulation, and were our means of investigation refined, we should discover, perhaps, that a greatly increased quantity of blood is deprived of its spiritual properties.

The undue or vigorous action of several important organs is seldom observed at the same time; illustrating the economy of nature. Their consecutive activity secures an abundant supply of blood which could not be furnished otherwise. The constant modifications in the distribution of it are inexplicable on the impulse of the heart and the contractility of arteries. They are evidence of the independent influence of the capillaries. If such can increase or diminish the amount of circulating fluid in an organ, on what grounds can it be denied that they affect the motion of the blood in the veins?

The inquiry into the functions of the capillaries will enable us to account for the variety of tension in the veins. It is stated by Magendie, that no two have the same degree, and this result, so unexpected from the tendency of compressed fluids to establish an equilibrium, is in perfect conformity with the views which it is our object to develop. Every organ has its own independent system of capillaries. The blood which it receives is modified both in properties and circulation, according to the nature of the function. The difference in the vital actions must be mainly attributable to the capillaries; and the effects of their operation

are different in each organ. Legallois has shown that the venous blood returning from the several viscera is not identical in its properties. Though supplied with the same arterial fluid, the processes and effects in each are peculiar. In one, this fluid is essential to the mysterious operations of the mind,—in another, to the secretion of urine,—in a third, to the formation of gastric juice; and to various other important actions. The mechanism of the organ, or the structure and disposition of the capillaries, explains these different results. Each viscus has its independent capillary system, in which both the properties and the circulation of the blood are modified. It is illogical to admit one and deny the other; for that which causes a change of properties depends upon, or gives rise to, a peculiar circulation.

The modifications which the blood undergoes in the capillaries shows how inaptly organic vessels can be compared with inert tubes. The one produces two important effects,—a change in the properties and the circulation of the fluid;—the other neither retards, facilitates, nor otherwise affects it. Guided by those views which, indeed, mainly rest on experiments, the different degrees of tension in the venous system are easy of explanation. The capillary systems are new sources of motion, and as they differ in each organ, in regard to structure or disposition, the blood flowing into the veins will be carried forward with a pressure corresponding with the forces in operation. How far these forces are modified by the situation and functions of the capillaries is beyond our power accurately to determine. We may, however, be permitted to speculate on the subject. Where the functions are exceedingly refined in character, and free from the direct influence of bodily exercise, the blood resulting from their operation will flow with less force than from organs, the seat of grosser vital processes, or processes liable to be excited by frequent muscular contractions. The tenuity of the vessels will bear a relation to the delicate and complicated offices performed by them. We should scarcely imagine the cerebral capillaries to be of the same character as those of the thigh. In the one situation, an immense quantity of blood is distributed for the purpose of maintaining the elaborate and ceaseless operations of the brain; in the other, the functions are such as are largely essential to the organic existence of the part. The vessels of the latter are in a great measure only carriers of the vital fluid. These are important distinctions, and are associated with corresponding differences in the tension of the veins directly connected with them. According to Magendie, when the hemadynamometer was applied to the crural vein, the mercury oscillated between,—55, 60, 63, 58, 60 millimetres. Applied to the jugular, the mercury rose only to,—15, 17, 15, 16, 17, 16 millimetres. He attempted, in both cases, to render the

results more remarkable by circumscribing the circulation. In the thigh, the whole of the blood conveyed by the femoral artery was made to return by the corresponding vein. The hemadynamometer then indicated,—80, 85, 75, 85, 80.

The instrument was placed in the right external jugular vein, and a ligature was passed round the left, so that, with the exception of the small quantity of blood returned by the internal jugulars, the whole was directed against the hemadynamometer. The mercury, however, even then rose only to,—24, 23, 20, 23, 25, 24 millimetres. This is a very slight increase on the results obtained previously to the application of the ligature. These two experiments are important. They show that, when the blood is placed in analogous circumstances, the tension in one vein is almost four times greater than in another. Such differences are inexplicable, on the doctrine that venous circulation depends altogether on the impulse of the heart. In both experiments the motive power is concentrated and confined to one channel—leading to the instrument, and yet the disparity in the tension indicated is extraordinary: they may be adduced in corroboration of the conjectures advanced, respecting the peculiarities of the capillary systems and their corresponding influence on the motion of venous blood. Magendie found venous tension to vary greatly in all parts of the body, and so far from this being a startling and unexpected result, it might have been predicted from the important functions of the capillaries and their independence of the direct impulse of the heart.

Our next task is to endeavour to explain the seeming relation in the quantities of the blood transmitted and received by the left ventricle and right auricle. It has already been stated that frequent inequalities exist in regard to these quantities. Congestion occurs when one cavity conveys more than the other receives in equal times; and it is subsequently removed by the translation of the preponderating influence. The amount of the inequalities is no part of our consideration. The fact alone concerns the inquiry. The capillaries are admitted to be the seat of all vital actions; and it is equally incontrovertible, that the quantity of blood used or deteriorated, in any given period by them, may be considered as measured by the quantity of blood sent into the aorta by the left ventricle, in the same time. When these actions are excited, they require a proportionate increase in the supply. When enfeebled, the demand diminishes accordingly. In the one case, the contractions of the heart become strong and frequent; in the other, weak and often quick. These actions are, indeed, the regulators of the quantity transmitted and received by the two sides of the heart. They maintain a general and necessary relation between them. When depressed, they are incapable of conveying forward the whole of the blood sent by the left ventricle, and consequently a portion is

retained. The lessened quantity sent into the veins is the measure of the amount of vital action existing ; and if the depression be great and of long continuance, this quantity gradually diminishes ; and, at length, the left ventricle and right auricle transmit and receive corresponding quantities.

If a part of the vital fluid is arrested in its course, a less quantity will necessarily pass from the right to the left side of the heart. Extensive congestion affects both the capillaries and the large internal veins. There is no scarcity of blood at the right side of the heart, but, on the contrary, accumulation ; so that the diminution in the quantity received by the right auricle is not attributable to any deficiency in the vicinity of it, but to the enfeebled action of the cavity, arising from the deteriorated qualities of the fluid. This circumstance is important to bear in mind, showing that though the relation in the quantities received and transmitted is maintained as in health, the diminution in the quantity received by the right auricle is not referrible to the weakened impulse of the left ventricle. The one is not, indeed, the immediate effect of the other.

According to these views, the relation between the cavities of the heart is not fixed or invariable, but is liable to modifications, and such as would never occur were the pressure of the arterial column the cause regulating the ascent of the venous. We have endeavoured to show that the small quantity of blood flowing into the right auricle during the existence of congestion is the measure of the vital actions carried on in the capillaries, and though proportionate to what is injected into the arterial system, is not displaced by it, as in the case of inert tubes, nor do they stand to each other in the strict relation of cause and effect. The capillaries alone regulate the quality of blood received and transmitted by these cavities, maintaining in health what may be designated the balance of circulation ; and giving rise in all morbid conditions to important modifications in the quantity and distribution of the vital fluid. If these views, and the arguments founded upon them, are correct, it is evident that the principles of physical science have hitherto failed in their application to elucidate the phenomena of circulation.

The views advocated in these pages afford a satisfactory solution of phenomena which are certainly inexplicable on the prevailing doctrines of physiologists. These throw no light on the circulation in the fœtus. It will scarcely be contended that such is under the direct control of the maternal heart. The blood flowing from the placenta does not manifest this dependence, nor is there a direct connection between the vessels which terminate and originate in this organ,—a condition essential to the transmission of the influence. In monstrosities the heart is often wanting,

and yet circulation is efficiently carried on. These phenomena present no difficulties on the principles which give to the capillaries an independent source of motion. The chyle is absorbed by them, and conveyed into vessels which gradually enlarge and diminish in number, until at length they form the thoracic duct. This effect cannot be ascribed to any central impulse, or the pressure of a descending column. Nor can the received views account for internal congestion or its removal; for the formation of tumours or their dissipation. To explain these phenomena we are compelled to have recourse to the action of the capillaries.

The experiments of Poiseuille, on the circulation of blood in the veins, are not altogether free from objections. The hemadynamometer arrests the venous current, consequently the pressure indicated will not be the measure of the force with which the fluid is moved under ordinary circumstances, but the force resulting from the accumulation of it. The tension will in all cases be increased, but not in all situations equally. In the strictures on the application of the instrument to the arteries, this accumulative force was shown to be uniform. Hence there is a striking difference in the condition of the two systems of vessels. We have admitted that the hemadynamometer probably furnishes an exact measure of the impulse of the heart, but the condition which enables it to solve this difficult problem renders it altogether inapplicable as a measure of the circulation in different arteries. To whichever the instrument is applied, the course of the blood is arrested, and as this cannot possibly move forward, it necessarily becomes a small oscillating column, receiving, as a rod of iron would under similar circumstances, every successive impulse of the left ventricle. Were there any difference in the tension of arteries, according to this view, it would arise only from a difference in the length of the columns acted upon, but which cause could not disturb the uniformity of the results. Were venous tension directly dependent on that of the arteries, though less, it would exhibit no variety. The current is interrupted by the application of the instrument, and therefore the tension produced is neither that which is natural to the vessel, nor to the venous system generally, but is the amount of an accumulative force, occurring equally in the experiment both in arteries and veins. If the blood, therefore, flows in the latter from the impulse of the heart, to arrest the motion of it is clearly to ascertain the force *a-tergo*. If this in one case is accumulative, it is indisputably so in every other, and yet the indications are very dissimilar in different veins. The instrument applied to the crural vein gives a pressure of 62, 55, 58, 60, 58 millimetres.

When a ligature is passed round the limb, in order to confine the circulation to the crural artery and vein, the pressure is

increased to 80, 85, 75, 85, 80 mill., which is stated by Magendie to be the amount of pressure furnished by the crural artery. How different are the results from a similar experiment on the jugular veins! A ligature being passed round the left external jugular vein, the blood returning from the head is almost wholly confined to the right, to which the instrument is applied. The internal jugular veins in the dog are exceedingly small, and cannot materially modify the experiment. The mercury, however, rose only to 24, 23, 20, 23, 25, 24 mill. How remarkable is the difference in the pressure of the two veins under very analogous circumstances, and yet the same amount of propulsive power is stated to urge the contents of both.

The reason which Arnott assigns for the difference in the tension of the arterial and venous systems, viz. the means of escape for the venous blood into the right auricle, does not explain the differences observed in the tension of the veins, because in all these experiments the contents of these vessels are equally arrested by the instrument, and, therefore, if the impulsive force acting behind is one and the same for the whole of the venous system, the indications of pressure should be the same.

The experiment on the crural vein establishes the justness of this reasoning. In what condition is the blood placed in this vessel on the application of the instrument? Is it permitted to pursue its course from the impulse received from the heart? It clearly cannot move beyond the space resulting from the slight elevation of the mercury. During the experiment blood continues to be conveyed to the limb; consequently the artery, vein, and the intermediate vessels become congested. This effect is inevitable, and the blood, having no means of escape, forms one unyielding column from the artery to the insertion of the instrument. The impulse of the left ventricle may possibly, on this occasion, be transmitted to the vein, as the stroke of the piston is communicated in a series of inert tubes in a similar condition. The two cases are analogous, and both exhibit an equal departure from the laws regulating vital operations.

The tension in the veins cannot be accurately determined by the hemadynamometer. Admitting, however, that the force with which the blood circulates in them, is derived from the capillaries, the results evolved by it are invaluable. According to this view, each organ generates its own propulsive power; and consequently, on applying the instrument, the accumulative force in the vessel arising from it is easily ascertained, as well as the variety of tension throughout the venous system.

In evidence of the little attention which Magendie had given to the condition of the circulation, resulting from the application of the instrument, other facts may be adduced. He endeavours

to determine the changes in the pressure produced by the injection of water into the veins. The hemodynamometer is previously fixed in the crural artery, and indicates a tension varying from 60 to 110 mill. When the dog became calm, a hundred grains of water, 39° Fahrenheit, are injected, which is repeated five times without any alteration being observed in the rise of the mercury. Between the sixth and the tenth injection there is a slight elevation. The experiment was continued until about a quart of water had been injected. At this period, the physiologist wished to ascertain the effects of the injection of water at 113° Fahrenheit on the same animal. The mercury was at this time oscillating between 60 and 115 mill; after three injections it fell to, —55, 70, 65, 80, 50, 55 mill.

After the fourth injection it rose to,—80, 90, 85, 95 mill.

The fifth, sixth, and seventh caused it to rise to,—100, 120, 115, 140, 125, 145 mill.

These successive injections brought the animal to the point of death. At the ninth, the mercury fell to 30 mill.; after the tenth it stood at 25, when the heart ceased to act. Even after death the mercury oscillated between,—17, 16, 15, 11 mill.*

The continuance of this pressure Magendie attributed to the fulness of the vessels. The analysis of these experiments will not be altogether unprofitable. It will show, and the truth is important to enforce, that the achievements of the hand, in physiological investigations, leave much to be accomplished by the mind. From these experiments no positive conclusions can be drawn. Were the action of the heart undisturbed by the injections, it would then be easy to determine the modifications produced in the tension in the vessels, by the addition of fluid at different degrees of temperature, but certainly not otherwise. The mental sufferings of the animal during the experiment are great, all of which will be accompanied with corresponding changes in the contractions of the heart, and consequently in the tension of the arteries. The amount or acuteness of the sufferings cannot be measured by the quantity or temperature of the fluid injected. Animals of the same kind will not be affected in the same manner, nor, indeed, the same animal at different times. To the modifying influence of these circumstances, the physiologist never once alludes, but at the conclusion of his experiments, remarks;—

“In order to ascertain the exact indications of the influence of heat and cold, relatively to the force with which the blood presses the parietes, it is not necessary to take into account more than the first injections. Thus, when we have seen the pressure increase towards the end of the experiment, we have attributed this effect, not to the temperature of the fluid, but to its volume. Nearly

* *Leçons sur les Phenomenes Physiques de la Vie*; Tom. iii. pp. 236, 237.

two litres of distilled water were passed into the circulating current."^{*}

When the pressure increases towards the end of the experiment, he states, it is not referable to the temperature of the fluid injected, but to its volume. The mere increase of volume does not explain the effect. When the quantity received by the veins is small, no particular disturbance is caused in the vital functions. They continue almost in their normal condition, but when the quantity is large, there is necessarily great derangement. The mental sufferings of the animal are increased, and difficulties are opposed to the free action of the heart. These circumstances combined tend to excite the vigorous efforts of the system. The heart must either remove the difficulties or cease to act. The struggling attempts to overcome them are the occasion of the augmented pressure. A further increase in the quantity injected at length oppresses the heart, and, as a necessary consequence, the mercury gradually falls, until it stands at 25 mill. The effect arising from the simple addition of volume does not admit of calculation.

It is now time, however, to draw these investigations to a close. They have brought under review the opinions, arguments, and experiments of enterprising and enlightened inquirers into the functions of life, men, whose labours and reasoning always demand a respectful reception. It is not for us to determine the amount of their errors or the value of our exertions in the attempt to expose them. The decision rests with others, in whose hands we leave our claims to consideration, confident that justice will not be withheld where due, or correction spared where we have deviated from truth.

ART. III.—*Medical Notes on Syria ; or Practical Observations on the Diseases there treated during a residence of thirteen months, including Remarks on the Country, its Climate, People, Resources, and an Account of the Plague as it occurred in Bairout in 1841.* By EBENEZER ROBERTSON, Lic. R. C. S. E., Surgeon Royal Navy, and Medical Officer attached to the British Staff and Ordnance Detachments serving in the expedition to Syria in 1840 and 1841.—In a Letter to Sir William Burnett, Kt. M.D. (Continued from Vol. lix. p. 254.)

PART II.—*Prophylactic means ; peculiarity of Pyrexial Dis-*

* Tome iii. p. 239.

cases of Summer and Winter—use of General Blood-Letting, its hurtful effects illustrated.

In turning to the consideration of the diseases, the immediate object of these notes, it is not my intention to enter into either a detail of diseases, most of which have already been described as the production of other countries, or to dwell upon speculative views relating to causes and their operation.

Those ordinary diseases of a community existing *a priori*, or as a necessary consequence of the mode of life or customs incidental to society, or an aggregation of individuals, comprehending all milder affections arising from changes or alterations of seasons or temperature, irregularities of living, or the multiplied causes predisposing to or exciting those diseases of every day occurrence, require no particular notice. They occur much in the same way; assume, with occasional varieties, the same character, follow courses similar to those observed in the disorders of other countries; and require the same treatment, with such modifications as the peculiar habits of the people, the state of the seasons, and particular idiosyncrasies presented, demand.

As far as relates to prophylactic measures, or those rules which we ought to observe, enough has already issued from the press in the works on tropical climates, &c. I merely mention, that great attention must be paid to the state of the secretions, and all ought carefully and sedulously to avoid unnecessary exposure or undue exertions, whilst

“vertical, the sun
Darts on the head direct his powerful rays.”

Before going into the detail of the individual diseases which it is our intention to notice, I premise a few general remarks on the peculiarities of the pyrexial diseases as they occur in summer or in winter, and on the use of blood-letting in their treatment.

The pyrexial diseases of this country, in winter or in summer, we find characterized by either extreme depression or great excitement (nervous) in their early stage. During the summer months, the whole nervous system is kept in a state of great irritability, the result of the long-continued high temperature; which stimulus, on being withdrawn at the commencement of winter, and neither supplanted by any other, or succeeded by a degree of cold sufficient to bring it back to a proper tone, leaves it in a state of great debility, insufficient to resist the many predisposing and exciting causes continually in operation. Hence the highly nervous febrile diseases of summer, ushered in oft without the slightest rigor or chill, and presenting at the very commencement all the symptoms indicating high febrile reaction, and the low adynamic

state characteristic of those febrile diseases prevalent during the winter months.

General blood-letting, extolled by many as the only sheet anchor, &c. will be found, in the treatment of the diseases of this country, to be in many cases totally inapplicable, in others doubtful, and in all dangerous.

In the low fevers of winter and the early part of spring, when the appearances at first resemble more those of congestion, the abstraction of even the smallest quantity of the vital fluid, will be attended with most melancholy consequences, and instead, as in the first stage of congestive fever, which it so closely resembles, of finding the breathing become more free and deeper, the pulse fuller and softer, and the whole system as if relieved, it will be our melancholy fate to behold the patient sink, without being able to stretch out a hand to save him from that gulf, into which, by our imprudence, we have hurled him. On the other hand, if, becoming alarmed at the severity of the febrile attacks of summer, we mistake the full and sharp bounding pulse, the flushed countenance, suffused eye, and piercing headach, indicative of nervous disorder, for high inflammatory excitement, and boldly plunge in the lancet, with the determination to "continue the flow from a large opening till such time as we produce an impression on the system, and repeat it" at each exacerbation, which, as we reduce the strength, we will find to be proportionally more severe, though shorter in duration, the patient either sinks under the effects of over-depletion, or is so enfeebled, that watching for hours, united with all that stimuli (diffusible and permanent, with other means combined,) can effect, will give the sole chance of restoring him to the bosom of his family, but in so shattered a state, that, for months subsequently, he will present full evidences of the malpractice which has been pursued. This may be viewed by many as an overdrawn picture, written to produce effect; but it is one the result of dearly bought experience, too frequently brought before notice by the French and Italian practitioners of that country, who would not be convinced by the evidence of death itself. I have before me many cases which made an impression on my mind that will not be easily erased; the detail of one or two will be sufficient.

I was called to hold a consultation on the chief dragoman of the Russian Consul resident at Bairout, in whom encephalitis was thought to have supervened to an attack of bilious remittent. We met there four medical gentlemen, who having previously consulted, only waited our arrival to again deplete the patient, who was labouring under one of the many effects of over-depletion. The case is shortly this; he had had an attack of bilious remittent

fever, as above stated ; had experienced four exacerbations, on the occurrence of each of which he had been largely bled, both generally and locally. Each succeeding exacerbation was described to be more severe, although shorter in duration. When visited he was found to be in a state of perfect apyrexia, with soft flowing pulse, cool skin, gently bedewed with perspiration, moist tongue, and devoid of any complaint save that of extreme prostration of strength and a painful sensation in the brain on moving the head, which last, by the four before-mentioned, was looked upon as indicative of approaching encephalitis. It was a case too obvious to require hesitation ; my opinion was shortly stated, that " I would not be a party to such practice." After a rather lengthened argument, which terminated in my being permitted to conduct the treatment, stimuli were ordered to be carefully administered, light nourishing soup, perfect quietness, and small doses of quinine and calomel to rouse the system. Sleep, soothing and refreshing, succeeded, and the following day their eyes were opened to the true nature of the case ; daily improvement took place, and although the patient was long in a very debilitated state, before I left the country he was able to return to his duties.

One other case, but not attended with such satisfactory results, immediately followed ;—congestion of the lungs, also the consequence of over-depletion, was mistaken. Leeches were freely applied, bronchitic effusion took place, and when I was called in, the vital spark had nearly fled. Ammonia and camphor, with wine, were exhibited internally ; warm frictions to the extremities, &c. ; but all proved equally unavailing, and in a few hours the patient breathed his last.

Many more illustrations of the evil consequences attendant on such a practice could be enumerated, but we trust the above are sufficient. Though I thus reprobate such treatment, it is not my wish to throw obloquy on a remedy which, if used with great care and discrimination, may be serviceable. But in my extended experience, even in combating the nervous fevers of summer, in our well-fed British soldiers, the lancet was never once used, and never had I the slightest cause to regret its omission. It must not be concluded, however, from what has been said, that this applies equally to all parts of the country. I see no reason why it should not form a very useful remedy in the mountains, or in the more northern latitudes, during the winter season.

I was early led to such conclusions, and subsequent experience every day made me more fully alive to the importance of combating those pyrexial diseases by the other means in our power ; such as calomel, tartrate of antimony, calomel and opium, calomel and quinine, &c., as will be particularly taken notice of in their proper places.

I. Ephemeral Fever.*—This fever, the production of which may be referred principally to over-exertion, mental or corporeal, unguarded exposure to a high temperature, irregularity of habits, or sitting down when heated either in a cool place, or in what may be for a time a pleasant breeze, is almost of every-day occurrence during the summer months. It may be so very slight as scarcely to attract attention; or it may be a little more severe, causing restless nights, disturbed unrefreshing sleep, want of appetite and aversion to exertion, mental or corporeal. The tongue feels parched and the mouth uncomfortable, the morning succeeding; the nightly exacerbations, which come on shortly after sunset, terminate early in the morning in diaphoresis, which in the milder cases is frequently succeeded by a somewhat refreshing sleep; the skin, even during the period of exacerbation, may remain moist, covered with a perspiration which, though heavy at all times, becomes very offensive after the exacerbation. This last species is attended with greater debility and prostration of all the powers than the others; the bowels will be found in all cases to have been for some time more or less irregular, and the urine of the morning high coloured, depositing a heavy dark-coloured sediment.

This affection, although it scarcely forms a subject of medical observation or treatment, save in its severe forms, ought never to be overlooked; the exhibition of a little medicine, as *Pil. Hydrargyri*, followed by a seidlitz powder, to which one or two drachms of Epsom or Rochelle salts may be added, and taken on the empty stomach in the morning, and the regulation of the diet for a few days, may frequently save it going into a more severe form, or, from its continuance, produce a debility predisposing to some of the more severe forms of fevers then prevalent.

II. Continued Fever.—This disease, which is met with frequently in the winter months, is not sudden in its attack, the person generally complaining of "feeling unwell" for a period varying from two to five or six days previously. We refer not, however, to the continued of summer, being perhaps more properly treated as a distinct disease, under the appellation of the nervous fever of summer. It occurs in the plains in its most simple form, but is often attended with inflammatory complications in the higher parts or more northern latitudes; it may be either severe or mild in its attack and course, which may be characterized again, by a greater or less approximation to more or less excitement or depression. It rarely lasts for more than three or four days, and then terminates in diaphoresis, or it may take on the remittent or intermittent forms, or may lapse into the typhoid; or the febrile reaction

* It may be termed the Seasoning Fever, for every individual arriving in the country, during the summer months, is sure to be seized with one of its forms within the first forty-eight hours.

may terminate suddenly, the vital powers rapidly sink, the sufferer being devoid of all pain, free from any complaint, and oft not bereft of intelligence, till immediately before the separation of the spirit from its corporeal tenement.*

As in all other diseases, it is most important in this to clear out the bowels well, and that briskly; perhaps, the best purgative which can be exhibited, is ten grains of calomel with a quarter grain of tartrate of antimony at bed-time, or as soon as the case comes under observation, and followed either in the morning or three hours subsequently, by the black draught given in small doses frequently repeated, so as to excite free and full catharsis. The reaction may then be combated by tartrate of antimony alone or in combination with nitrate of potassa. The tartrate of antimony will be found preferable to the antimonial powder or James's powder, which frequently failing to produce the desired effect, has been productive of a considerable increase of the exacerbations which are obvious at evening, causing them to amount in some cases to delirium. After the first remission, which, as before stated, may be looked for about the third or fourth day, it will be advisable, if the state of the tongue will permit, to give a few small doses of the sulphate of quinine; if it should lapse into any of the states taken notice of above, each must be combated by those means which will be mentioned when speaking of them individually under their respective heads. In the mountains this is said to be a frequent disease during their winter months, but to assume more the character of synocha, and to be often complicated with *pleuritis*, *pneumonia*, and *bronchitis*. The native haykims bleed generally and locally, and apply the counter-irritants spoken of in the general remarks.

III. *Intermittent Fever.*—This is a disease which, everywhere prevalent and always existing, becomes at some seasons and in some districts, much more severe in its attacks, more formidable in its character, and more resisting in its cure. The great prevalence

* We saw this last fully verified in the lamentable and melancholy death of our much respected and lamented talented Commanding Officer, Brigadier General Mitchell, C. B., &c. &c., who fell a victim to continued fever, the consequence of great fatigue, (mental and corporeal,) and exposure to severe weather, whilst he accompanied the frantic and unsuccessful advance made on Gaza by Jochmouss Pacha in January 1841. In this case, the fever, which was never very severe, and of very short duration, ceased, and with it all nervous energy; the pulse became lower and softer, the extremities colder and colder, the voice weaker and weaker, and on the forenoon of the fifth day from his first complaint, after partaking of a little soup, he lay down and fell into what at first appeared to be profound sleep, but proved itself to be the soft and quiet sleep of death. Thus died at a few minutes after midday of the 23d of January 1841, that officer, whose name will ever live in deeds too well known to require further notice. His remains were deposited with military honours by his brother officers in Sir Sidney's Bastion at Jaffa, where a marble slab, whilst it points out to the eye of the traveller an object of interest, calls upon the nation to honour the grave of a brave soldier.

of this disease may very properly be referred to the large portions of swampy and marshy ground in the neighbourhood of all the towns, arising in a great measure, if not in some cases entirely, from the extensive irrigation used for the gardens, found wherever habitations exist. If we look towards the mountains, (the lower ranges of which, as previously noticed, are converted into gardens and well watered,) we find the valleys and gorges, shortly after sunset, filled to many feet with thick fogs or vapours. Although the inhabitants of those more immediate seats probably of paludal miasma, are not always the greatest martyrs to it, (those living at a little elevation frequently suffering considerably more) they generally look unhealthy, sallow, and emaciated; and in many cases unfit to fulfil the most simple duties of social life. Though, from having been born and bred under its influence, and as if from local habituation, they become inured, and enjoy freedom from attacks, yet it only requires a transference for a few weeks to another district, and they are certain on their return to suffer from a disease to which previously they had been strangers. Several parts along the sea coast may be mentioned as being more productive of this disease, Scanderoon, Tripoli, Bairout, Acre, and Jaffa, none of the others being sufficient to demand individually particularising; for what applies to one applies equally well to all the others.

Around the first village are extensive marshes and swamps, which exert their influence, not only on those unfortunate few who are doomed to inhabit the wretched hovels there, but also on those who are compelled to visit it, being, as it is, the sea-port of Aleppo. During the sway of Ibrahim Pasha in the country, it was brought before his notice. Attracting, as it did, so much attention, the whole was drained, and canals formed to carry off the waste water continually flowing from the hills, &c.; for two years subsequent to the completion of these salutary exertions, an almost perfect immunity was enjoyed, but the soldiers, at the commencement of the operations in 1840, destroyed the embankments &c., and soon reconverted, what had become cultivated land, into their former state, and the disease, which had almost been banished their neighbourhood, again resumed as severe a sway as formerly. Passing over the country in the immediate neighbourhood of Tripoli, &c., and turning to Bairout, we find a considerable tract of land stretching between the town and the river, the whole borders of which present nothing but extensive swamps, and the gardens themselves there and everywhere around the town, are, from the continual irrigation, kept in a greater or less degree of moisture; again, immediately behind the town, is a portion of undrained ground which receives continual supplies, &c., from the springs

in the neighbourhood, which, with the others, and many more too tedious to mention, afford an abundant source for the production of those miasmata producing this and the remittent, which are found always to go "hand in hand," and frequently at their particular seasons to run into one another. Again, passing over the immediate neighbourhood of Tyre and Sidon, where we find much the same state of matters, we arrive at the plain of Acre, which affords a more extensive field, not only for these fevers, but of others of a more fearfully severe and deadly type, than any other district that can be mentioned. The several rivers which flow through it having at particular seasons their mouths choked up by the sand driven in by the sea, overflow their banks which are low,—which, aided by the water used for irrigation, &c., convert the adjacent fields and lands into extensive marshes in which the bullrush delights to grow, the bull-frog to croak, and fevers to revel in their full force. Viewing the particular character of the land for miles around this celebrated fortress, (whose position is low and exposed,) coupled with its extreme filth, that of its inhabitants and the great scarcity of water always experienced, one cannot feel astonished that diseases of so virulent a character sometimes exist there—that epidemics, &c., assume so formidable a type, and are attended with so fearful a mortality,—but only that it is ever free from scourges and pestilence.

To detail what is observed around Jaffa and the other towns intervening between it and Gaza, would be useless repetition. When, to all these already existing causes, we add the extreme filthiness of all the towns generally, the collections of smoking heaps of decomposing animal and vegetable matter in the very court-yards and in every corner, the want of cleanliness in their persons, the crowded state of their houses, the want of adequate ventilation, the inactive habits of the people, the offensive state of their open common sewers (running through the centre of their streets or bazars) from which an offensive effluvium arises in the hot weather, we can easily comprehend why the inhabitants of the towns do not enjoy an immunity from diseases,—why they suffer more,—have a less healthy appearance, shorter life, greater mortality, and more congenital deformities, than the inhabitants of the mountain districts; or, that such a disease as the plague should claim those countries as the place of its birth and the scenes of its ravages.

This disease, always present, is more severe and less tractable in spring and autumn, during the prevalence of the first and last rains, than during the intense heat of summer, when the whole surface is more or less parched, or in the middle of winter, after the rains have fallen for some time; during those periods it is less frequently met with, and yields more readily to the curative means

employed ; it assumes all forms, but the tertian is the most frequent. We never experienced any difficulty in combating the attacks, but the only hope of obviating a recurrence is by flying to the mountainous districts ; if the attacks be very severe, and tell much on the individual, removal, when practicable, from the country during the seasons of its particular prevalence and severity should be resorted to. If neither of these plans can be had recourse to, the only other means, we are aware of, are by keeping the system continually under the influence of quinine, omitting it during the summer, or as occasion or circumstances may present. This I have known succeed in several cases.

In the aguish districts, or in places which are under the influence of the paludal miasma, partial intermittent, or pains in the infra or supra-orbital nerves, hemicrania, or neuralgic affection of various other parts, observing a regular intermittent form, are frequently met with. As before-stated, we often find an accumulation of worms in the intestinal tube, producing, or rather giving rise to febrile paroxysms simulating the intermittent, and which resist all the usual remedies, till we have succeeded in expelling the parasitical animals, when the symptoms disappear.

This class of fevers the natives call *dorriac*. In many of the mountain districts, they resort to no remedy, but trust to it either being for a time removed by the appearance of some other disease, which it not unfrequently complicates, or by a change of seasons. The poor objects, like many of those living under the influence of the miasmata, present a sallow, sickly-like, emaciated appearance, and after a time, labour under various visceral degenerations, making life scarcely bearable, or still more wretched by their sequences, dropsical effusions. In other districts, and in the more civilized parts of the plains, we find the haykims either solely making use of the remedies, the produce of their country, taken notice of at page 252, Part I., or having resort to remedies made use of by ourselves, procurable now in almost every town of any note. I never experienced any difficulty in combating this disease ; out of the fifteen cases under my care, amongst the British detachments, where I could carry into effect my own views, one only experienced a fourth paroxysm. The *first* object to be obtained is the clearing effectually the intestinal canal from that large collection of matters which it will be found in most cases to contain ; *secondly*, the bringing the system as speedily as possible under the influence of sulphate of quinine, which may be regarded as a specific ; and *thirdly*, to endeavour to obviate any source of a chill for some time previous to the hour at which the paroxysm may be likely to appear, and at the same time to endeavour to excite the system, by the application of heated vessels, and the exhibition of warm fluids. In a few cases, in which,

from over-anxiety, the quinine had been pushed to a greater extent than desirable, leipothymia and deafness were induced; the former of which was at the moment relieved by the exhibition of brandy and water hot, and the application of carbonate of ammonia to the nostrils; the latter, by gradually reducing the medicine, and from time to time administering cathartics. But although success in this country uniformly attended the exhibition of the quinine, we have elsewhere seen it of no service,* even although pushed so far that the stomach refused to bear it; but in which, by the change to Fowler's arsenical solution, preceded by brisk cathartics, the desired end was gained. Benefit is derived, and frequently the recurrence of the paroxysms obviated by recommending the patient to remain a few days after the removal of the characteristic symptoms in bed, for some time previous to the wonted hours of attack. The particular treatment pursued in this disease may perhaps be best indicated from the following case.

CASE.—Joseph Richards, M., aged 21, was admitted into hospital, at Jaffa, on the 15th of January 1841, complaining of having felt unwell for a day or two; his bowels were irregular, and he suffered under an almost insupportable pain in the lumbar region,—(this was frequently a very distressing premonitory, concomitant and subsequent symptom,)—a brisk cathartic of calomel and jalap was administered, followed by an antimonial saline cathartic mixture.† By these means the bowels were freed from a large quantity of very foetid fæces, affording relief to his uneasiness. The day following (18th), shortly before noon, he was seized with a severe rigor, succeeded in due time by the hot fit, which, again, about 8 P. M., glided into the sweating stage;—(during the hot stage the throbbing of the temporal arteries, and the lumbar pains were very severe, and the pulse rose to 102.)

On the 19th, Slept well, and expressed himself only weak; pulse soft, 80; skin cool and moist; bowels free.

R. *Quinaedisulphat.* gr. xvi.; *Acid. Sulph. dil.* ʒi. *Aquæ O. I. M. solveque.* ʒi *omni hora, increscendam ad ʒii. 11 et 11½ horis capiat—meridie potion. calid. habeat.*

12½ Experienced another paroxysm, scarcely so severe as the former. 20th, felt pretty well. *Contin. medicin. sed* gr. ii. *quaque hora; cum* gr. x. 11, 11½ *et 11½ horis capiat potion: calid. repetend.* He was then well covered over with warmed blankets, and had heated bottles applied to the hands and feet; was kept so till after 1 P. M. He was then found to have had only a slight sensation of sickness; pain in orbits and lumbar region, which still

* In the Bay of Baiae, coast of Naples.

† See appendix 6, a.

remain. To have a little good soup with rice and toast, and the medicine to be continued, but repeated every three hours only. *Vesp.* has been up a little, and felt very comfortable and easy, save the great weakness in the loins. To omit the quinine, and to have a calomel dose to-night, followed by castor-oil in the morning early. 21st, 9 A. M., the bowels have acted freely. To continue the medicine as prescribed on the 19th, but at 11, 11½ and 11¾ A. M., to have three-grain doses; the warm drink and covering as yesterday. 1 P. M., the surface covered with warm diaphoresis; experienced none of the sensations of yesterday, save that of the back. The quinine to be continued in one-grain doses every three hours. 22d, felt well and comfortable. To take the medicine every two hours in two grain doses; and to go to bed at 11 A. M.; to have a warm drink at 12, and endeavour to obviate a chill.

By February 2, when he was discharged to duty, he had experienced no return of the paroxysms; the quinine was gradually lessened, and his bowels properly regulated.

In concluding the notice of this class of diseases, I must mention, that in all my experience of this affection, amidst all ranks and classes, in all situations of life, and under all peculiarities of circumstances, I never yet have observed any case demanding in any degree, however slight, that so much vaunted remedy, "general blood-letting in the cold stage."

IV. *Bilious Remittent*.—Although this fever will be found to be always prevalent, under one of the three following subdivisions, of which we purpose taking notice, we shall find it occurring in its severe form of the severe bilious remittent, principally in the latter part of the summer months, the autumn and early part of winter; arising from the long continuance of high atmospheric heat in the first, and from the superadded atmospheric vicissitudes experienced in the two last,—deranging the functions, and frequently causing organic lesions of several of the principal viscera, more especially the liver. It may arise without the influence of paludal miasma, or the effluvia natural to particular districts—which two, singly or combined, may give rise, when in full operation, to certain varieties, constituting the particular endemic of places or countries. Moreover, during the great solar heat, we find that the biliary function has been more or less deranged, the liver being principally acted on, vicariously as its function is of that of the lungs, as is fully proven from the frequency of that species of diarrhoea termed bilious diarrhoea; and the whole system then is a truly irritable state, fully predisposed, and only awaits the occasional exciting causes peculiar to that or those particular season or seasons to excite fever or fevers, against which the system has not power to contend, or strength to resist. And again, in the malignant form, or what I have termed ataxoid re-

mittent, more prevalent during the latter part of autumn, and throughout the winter, we see sufficiently obvious predisposing causes, without having recourse to invisible or less obvious ones—in the relaxed or debilitated state in which the whole nervous system is left by the withdrawal of the stimulus of solar heat,—by which it has been so long kept in a state of excitement, without any equivalent succeeding stimulus to uphold it, or dry cold, instead of relaxing and chilling rain and damp, to give it tone; and in the extreme depressing causes, resulting from breathing an unwholesome atmosphere, and imbibing water almost poisonous, proceeding from the decomposing masses of animal and vegetable filth, at every step met with in these crowded, ill-ventilated streets.

1. *Mild Remittent*.—This our first subdivision is met with throughout the whole year. Although usually attended with premonitory symptoms, it may, like the second variety, attack the patient suddenly; but he will be found, more generally, to have been more or less unwell for several days. The bowels being deranged, (as they generally will be found to be during summer, at least amongst travellers, and British or European residents,) the mouth having a disagreeable bitter taste in the morning, and the eyes more or less yellow; after a day or two there will be irregular flushes of heat, succeeding scarcely discernible chills, attended with dull, stupid headach, nausea, epigastric and hypochondriac tenderness on pressure, want of appetite, sparing and high-coloured urine. Towards evening, generally, the exacerbation occurs, and once in every twenty-four hours is very evident. This state may last for two, three or four days, and then give way to profuse diaphoresis, terminating in convalescence, assume the intermittent type, (not an unfrequent termination,)—or, after a remission of eighteen or twenty hours, may be followed by a more severe attack, constituting the second variety, or

2. *The severe Bilious Remittent*, which, as before stated, chooses the latter part of summer, the autumn, and early part of winter, as the period of its severe visitations. In this form, it is much less likely that there will be observed any premonitory symptoms. The person being suddenly seized, more especially if the bowels have been flowing for some days, and he unguardedly exposes himself to the rays of the sun; * he may have all the symptoms characterizing that described above, suddenly increased, or we may have the person suddenly affected with great prostration of strength, nausea, succeeded shortly by vomiting of a bilious offensive matter, which is both distressing and debilitat-

* We have seen men, apparently well, after taking a hearty meal, mount guard, and within an hour seized with a sensation of nausea and fainting, succeeded by vomiting, and febrile reaction devoid of any precursory rigor.

ing, tenderness of præcordia, rending headach, flushed face, injected conjunctiva, (which with the skin will in the generality of cases be found to be of a pale-yellow or citron colour;) dry tongue, which, whilst it is red and fiery round the edges, will present a furred or thickly coated centre; great thirst, with insatiable desire for cold fluids; dry, parched, and hot skin; urine small in quantity, high-coloured, and scalding on passing; bowels (if previous diarrhoea has not existed) costive and difficult to move; pulse, nervously sharp and excited, 100 to 120 or 130; exacerbations very sensible; remissions rarely clearly defined; *delirium ferox* is not an unfrequent symptom during the exacerbation, as well as burning sensation in epigastrium, with ineffectual attempts to vomit, causing the poor sufferer actually to writhe and twist himself. There is always more or less yellowness of the skin, which may increase considerably as the disease advances; but, though such exist, and there is always pain excited on pressure being made over the liver and gall-bladder, indicative of the congested state of the one, and the gorged condition of the other, yet never did I observe anything in the slightest degree approaching to what is called "the black vomit," occur before dissolution. This like the former may, after a varying period, terminate in a perfect remission, characterized by the occurrence of diaphoresis, which may at first be intermitting and offensive, then profuse.

If this desirable termination do not take place about the eighth or tenth day, a more frequent recurrence of the exacerbations takes place, gradually reducing the already shattered powers of life. The patient becomes comatose, and soon sinks under an accumulation of distressing symptoms;—or it may pass into the intermittent form,—or sudden death may take place from bilious coma,—or in the reduced state, from attempting to elevate the head and gain the erect position,—or he may fall into a low typhoid state, in which there may be either coma, or he may remain sensible till within a few hours of separation between the "shattered corporeal tenement" and its "etherial occupant." This last might properly be denominated the typho-adyamic stage; for although prostrate, and as if consumed by a burning fire, he utters no complaint; and, whilst he clings to the faint and vain hope of recovery, exacerbations frequently recurring, and consecutive diarrhoea supervening, soon exhaust him, and he sinks under a disease, which, when it has reached this stage, acquires an irresistible force.

3. This leads us to the consideration of the third variety, or the *Atavoid Remittent*, or what we would designate by the appellation of the Syrian fever, which may be regarded more strictly as a disease peculiar to the winter months, *i. e.* existing in

such, *a priori* ; but a state not unlike it, after the first few days of its existence, will be found to be the third stage of the disease last mentioned. As before stated, although it may occur amongst the better classes, it will be found to exert its sway more powerfully, more extensively, and with much greater mortality amongst those who are continually living under the influence of those predisposing causes, already taken notice of at length at page 43.

This disease is characterized not only by extreme debility, but by extreme depression of the whole nervous system, from its very commencement ; as may be inferred from the almost deprivation of all voluntary power, dulness of the intellect, stupid, unintelligent expression of the eye, sensation of fainting, or "gliding out of existence" in the erect position, nausea, cold extremities, blunted sensibility, congested state of the lungs, heart, and great vessels, difficult respiration, weak, tremulous pulse, in some cases almost flowing. Previously to the full development of this so formidable disease, the person will be found to have laboured for some days under those symptoms or sensations constituting general malaise, with slight febrile exacerbations, occurring irregularly, but more particularly forenoon and afternoon, the latter one in all cases being the more severe ; after a period, varying from two to six or seven days, they are succeeded by feelings of extreme prostration of strength ; disinclination to move ; the countenance becomes more depressed and anxious ; the eye dull and lifeless ; the breathing and rest of the symptoms as above described are all increased in severity, constituting the first stage of this disease ; to which the patient may fall a victim, from too great a depression of the whole system,—may have a struggled and ineffectual reaction,—or after a time, varying from one to two or three days, be succeeded by the second stage, or that of reaction,—characterized by the breathing becoming anxious and accelerated ; an inclination to move supplanting the previous listlessness ; the breath being hot and offensive ; the cheek flushed ; frequently only partially, and then resembling more that of hectic fever than the blush of febrile excitement ; the skin warm and parched to the touch ; the tongue, dry and red round the edges, furred, thickly coated, and not unfrequently moist in the centre, the lips parched and glazed ; thirst great, but not relieved by fluids, which rather excite uneasiness and vomiting ; the headach, from having been merely a feeling of stupidity, changes its character, and although in some cases reaches the length of mild delirium, in the generality of instances is merely an excited stupor ; the pulse nervously sharp, small, weak, and easily compressible, averages 120 or 130 ; the urine, although varying in appearance, being high-coloured, brown, or thick and dark, is always small in quantity, and very offensive. This stage may last in much the same state

for a few days, may vary considerably, and have various terminations. The exacerbations, (which are very evident and marked, in which there is a sensible increase of the epigastric tenderness, &c.) may recur once or more frequently in the twenty-four hours; at this stage also, the body, which has always shown a greater or less disposition to a pale yellow tinge, acquires a deeper yellow tint. This second stage may appear to be prolonged. Mild delirium, succeeded by coma, continues to advance; colliquative diarrhoea supervenes, and death ensues;—or it is changed to an intermittent, not at all unfrequent;—or the following, its more usual termination.

The patient about the* fifth, sixth, or seventh day becomes free from pain, says he feels himself recovering, whilst from the more frequently recurring exacerbations, although shorter and milder, it is too obvious that he is rapidly sinking; a drowsiness, from which he sometimes may be roused, gradually creeps on, and becomes more and more complete; the tongue parched, is shrivelled up and frequently chapped; the lips, which are shining, with the teeth become covered with sordes; *subsultus tendinum* and spasmodic twitchings of the facial muscles take place; the eye, dead-like, sinks in the socket; the voice, if sensibility and intelligence yet remain, is weak and scarcely audible; on being asked a question he gives a vacant stare, whilst an unmeaning smile curls about his lips; the breathing soft, is highly fetid and offensive; the skin bedewed with a thick oily offensive diaphoresis, becomes covered with petechiæ, &c.; diarrhoea, of late troublesome, now permits not a moment's respite; the discharges, mæna-like, flow insensibly from him; (discharges of blood sometimes take place from the mucous membranes; frequently repeated discharges of blood take place from the urethra in the case of Keilly, P. R. Mar., who sunk under the disease at Jaffa;)—he lies upon his back; the lower jaw droops; the temples and cheek sink; the intervals in the respiration become longer and longer; the pulse gradually weaker and weaker, is now only a thread; the exhaustion becomes extreme,—and he sinks without a struggle, or, on making an attempt to move or raise himself, falls back lifeless.

When recovery takes place, after the disease has passed into the third stage, which is not very frequent, the mind in many cases seems to have suffered, and the countenance wears an idiotic expression; the bowels are apt to be very troublesome and require great attention; deafness is a frequent symptom and sequence. All these, however, after a varying period, disappear by the exhibition of remedies suited to the ever-varying circumstances.

In describing the several varieties of this fever, I have presented

* We have given a latitude here of three days, as it is very difficult to be able to say when the disease actually commences, or from what day we are justly entitled to reckon.

each in its most simple and uncomplicated form, which, unfortunately, will not be too frequently met with. We shall now, as briefly as consistent with the subject, present those changes and complications which are apt or likely to occur.

It is obvious that a disease like this, influenced by so many external circumstances, ever varying and ever changing, according to locality, seasons, idiosyncrasies, particular predispositions, various exciting causes, must present an endless variety of shades and phases; but amidst so many, in looking to the more severe forms of the disease, we see several complications, obvious as they are naturally looked for. We refer to those of the nervous system, the liver and gastric mucous membrane. In other words, we may say that when the human frame has been for several months exposed to the stimulus of high atmospheric temperature, and not unfrequently and unavoidably to the direct rays of the sun, it is natural to suppose that all its organs become first excited, then relaxed, debilitated, and disordered, and in a state ready to sympathize with, or take on any action, which may be established in the body. Some of those organs, again, from the particular functions which they have to perform in the animal economy, must suffer in preference to, and more than, others. I refer particularly, in the first place, to the liver, which, from sympathy with the general stimulus imparted to the body, and its action being increased, is kept long in a state of high irritability, and therefore, when that stimulus is withdrawn, and no other substituted, is more likely to labour under inactivity, and to constitute a particular complication, especially in the severe forms of the disease just described. But there is another organ more important yet in its functions, which, suffering throughout the same seasons, from the same causes, also presents a complication. I refer to the grand centre of the nervous system, not overlooking, at the same time, the thousands of small centres, to be everywhere met with in the organic nervous system, which, though less obvious, no doubt suffer materially, and, though perhaps at the time attended with less serious consequences to the human economy, are, we doubt not, the cause of many of those distressing symptoms which torment the patient and harass the medical man. The third, or the gastric mucous membrane, suffers in common; and whilst the upper part* is the seat of troublesome symptoms in the early stage, the lower portions, in the course and termination of the disease, and throughout the convalescence, will always form an object of great anxiety. But it is not our intention to enter into all the different degrees of intensity of action, and

* In one case, that of a female of the better class, where irritability of the stomach existed to an alarming extent, (in which all remedies proved equally ineffectual for three days,) a living lumbricus, $11\frac{1}{2}$ inches long, was ejected, during one of the fits of vomiting, and thereby relief from this truly distressing symptom was only obtained.

the various organic lesions, which are likely to take place ; as theory without ample pathological investigations can prove of no avail. We would, however, before passing to consider the curative means to be employed in combating this class of diseases, remark, that the attacks in some cases may be sudden and ushered in without any premonitory symptoms or rigors ; that in others, general uneasiness may exist for several days ; that it may succeed a mere ephemeral fever ; that it may appear in a mild and tractable form, which may continue throughout its whole course ; that its attack may be so severe as to cause death to ensue after a couple of days ; that it may be mild at first and assume a more severe form, and gradually pass into the typho-adynamic state ; and that it may be ushered in with severe symptoms, which, after a few days, may suddenly cease, and assume the milder form. It may succeed intermittent or pass into it ; or sudden swelling* of the parotid and submaxillary glands may take place, causing death, as by suffocation, or add considerably to the inconvenience of the patient. They sometimes occur also during convalescence, or may appear as critical.

In only one case had we an opportunity of *post mortem* examination. The inspection was made five hours after death, which had been more immediately caused by bilious effusion. The surface of the body, which still presented a rounded and plump appearance, was of a deep-yellow colour ; the same was found to be the case also with the subjacent cellular and muscular tissues. On laying open the abdominal cavity the whole contained parts were found to be permeated by bilious effusion ; the liver, considerably enlarged, presented no morbid degeneration ; the spleen was larger than natural, darker, and easily broke down under the fingers ; the stomach and intestines healthy, as were also the other organs and those contained in the thorax ; but the gall-bladder was distended with inspissated bile of a very dark-green colour, so thick and tenacious that it could be lifted *en masse*, or drawn out into threads ; the gall ducts were pervious. The head was not examined. In another case which fell under my care, the subject of which had suffered five repeated attacks, and had been addicted to drinking, a large abscess formed in the liver, which, perforating the diaphragm and lung, communicated with the bronchi, through which the matter in very large quantities was expectorated. An opportunity for examination could not be procured.

Treatment.—In the mild form of this fever, little more is requisite than to clear out effectually the intestinal canal, quiet the

* Such also occur frequently during the plague, but considerable difference exists between the appearance and actual state of each. In fever there seem to be an infiltration of serous or sero-albuminous fluid into the interstitial cellular tissue, which, on being punctured deeply, flows out guttatim ; those in the plague may be understood by referring to Bubo. Art. Plague, and App. 7.

excited state of the nervous systems; and relieve any threatened or already existing congestion. These ends will best be effected by the exhibition of ten grains of calomel, with a quarter of a grain of tartar emetic, a combination which will be found to act beneficially as a sedative, and to yield its full advantage subsequently as a purge; three hours afterwards, if diarrhoea have previously existed, castor-oil with some carminative, or, if the reverse have been the case, a dose of black draught, followed by the saline purging mixture;* not in large doses to load the stomach, which will probably cause its ejection, but in doses of ʒi . repeated every hour till such time as free catharsis may have been induced. After the intestinal tube has been well cleared out, a pill of calomel and opium, or calomel and hyoscyamus, is to be exhibited, and may be repeated after three hours, if sleep be not induced. That the bowels are unloaded must be ascertained, not by the number of evacuations,—a very deceptive criterion in all cases, more particularly in warm climates, where the *fæces* frequently become impacted to such an extent that nothing but patience and perseverance with warm enemata, can remove them,—but, by careful examination of the evacuations, to observe that scybalous portions are no longer discharged. Thereafter, taking advantage of the disappearance of the exacerbation, if the tongue have become a little moist even round the edges, quinine should be immediately exhibited, so as to obviate a recurrence if possible. The best way to administer it is in the form of pills, or combined with a little calomel; subsequently all that is requisite is the due regulation of the secretions, and the exhibition of warm tonics; in which last, as already stated, quinine ought always to be mingled.

In the more severe forms the first desired objects must be attempted without loss of time; but the stomach may be so irritable, that we find the exhibition of any substance or fluid impossible; under such circumstances, we must then use medicated enemata, which, combined with the free application of leeches to the epigastric region, will be found, in the generality of cases, to allay the irritability, if not entirely,† at least so far that a large dose of calomel, viz. one scruple, may be exhibited. Under such circumstances, enemata must be repeated, and the calomel again had recourse to in smaller doses, and in the combination already mentioned; where such a state does not exist, we may continue the saline purging mixture in small doses, as above directed. The bowels being properly cleared, and the perturbed action a little moderated by the evacuating and

* The combination most useful is a mixture composed of one ounce and a-half of Epsom salts; one ounce of cream of tartar; two drachms of nitre; one grain and a-half of tartar emetic dissolved in a pint and a-half of cold water.

† It will be frequently necessary to apply either sinapisms, strong irritants, as turpentine and ether; or a vesicatory, which will act rapidly.

contro-stimulant mixture, a pill of calomel and opium may be exhibited a couple of hours before the nightly exacerbation, and repeated every two hours till the desired object, sleep, or at least quietness be procured. This course has been followed even where furious delirium existed, and has been attended with the most satisfactory and gratifying results ; the patient awaking from it refreshed and sensible.

When local affections supervene, they must be promptly treated by the local application of leeches and other means usually employed under similar circumstances ; careful pressure ought to be, from time to time, made gently over the abdominal cavity, so as to detect at the earliest moment, if possible, the supervening of inflammatory action. If the disease should, notwithstanding the means taken notice of, pass into its third stage, or that which we would call its typhoid or typho-adyamic stage, into that which we have so fully described as the third stage of the ataxoid remittent, our means must be varied ; but it will be better to delay our remarks on this state, till we have noticed what little is necessary to be said regarding the first two stages of our third division, the ataxoid remittent. As already mentioned, it may be easily recognized, the peculiar appearances presented, and which have been attempted to be portrayed, once seen, cannot be mistaken. Knowing, then, what we have likely to expect, there will be greater probability of ultimate success, our hand being directed by our knowledge of the course of a disease previously unknown. In the early period, when the depression is very great, we may, at the same time that we direct attention to the unloading of the intestinal canal, support the languid and depressed powers, by heat externally applied, by means of friction and warm vessels, and a little diffusible stimulant mixture, from time to time, carefully administered. The bowels may be very irritable, from causes already mentioned, and diarrhoea may exist ; such will be found to have originated from bilious discharge, and the evacuations will be described as hot and like scalding lead. Calomel, with castor-oil, will be found the best remedy in our possession ; the latter may be much more grateful and less likely to be ejected, by being exhibited with a carminative in warm coffee ; if it be refused, a somewhat large dose may be administered *per anum*.

In this particular class we ought to avoid all drastic or powerfully exciting purgation ; for the whole mucous membrane is in that debilitated or irritable state, that, if once excited, we may have to lament that our remedies may accelerate the fatal event ; diarrhoea appears soon enough, and forms a very vexatious and troublesome concomitant. During the stage of reaction very little requires to be done, save slightly moderating it by means of a simple saline julep, in which small doses of antimony may be exhibited. If we have been anxious to impress upon the mind of the practitioner the

necessity of careful abdominal examination in the last, we cannot too strongly do so in this. In the last, intestinal irritation, arising, as it is likely to do, during the stage of excitement, will be more obvious and more easily appreciated; whereas in this it approaches in so insidious a manner, that it may have advanced beyond the reach of medical art, if we depend on the patient informing us of it.

In this last stage we commence exhibiting one of the pills of calomel and quinine every two hours, evacuate the intestines by enemata, and support the gradually declining strength by wine-whey, soups, and the camphorated mixture, which means may be again assisted by the application, from time to time, according to circumstances, of sinapisms, either to excite the nervous system, restrain the bilious disposition, or control the intestinal debility. Sinapisms are preferable, for many reasons, to the vesicatory, which last often in this fever leaves sloughing sores, throwing another obstacle in the way of ultimate recovery.

The above means may be assisted by evaporating lotions to the head, from which the hair should be removed at the commencement. The means above recommended are to be continued and assisted by others, according to the gradually declining powers, avoiding either over-excitement, or an interval to elapse, either of which may cause a depression or exhaustion which we may fail in combating. The above combination* (calomel and quinine) has, in the author's hands, proved to be the only one of any real and decided benefit, in the treatment of the third stage of the severe, and in that of the ataxoid fever; and this disease, which, in the native or other practitioners' hands, is deemed beyond cure, he has with this powerful agent, successfully combated. It will be observed in the exhibition of this remedy, that the stools acquire a pitchy oily colour, which excites fears in the patient and his friends, if they have not been forewarned of it.

Two questions at this stage of our treatment intrude themselves on our notice: 1st, what stage or what appearances indicate that quinine may be exhibited? and 2d, what are the symptoms forewarning a favourable crisis?

As regards the *first*—we ought to take advantage of the first sensible remission after the stage of high excitement; or failing this, if, about the fifth or sixth day, we find that the disease, failing to assume any more favourable character, is gradually lapsing into the typhoid—in which, in the intervals of the exacerbation, there will generally be found a little moisture damping the edges of the

* He has tried calomel and columba, calomel alone, and other combinations, which it was in his power to make; for this combination he was indebted to Deputy-Inspector General Robertson.

tongue. At first the pills ought only to be exhibited during the remission; but, as we advance and have reason to apprehend the early development of ptyalism, we may continue them during the twenty-four hours. In the ataxoid, after the third or fourth day, we may commence, and paying no attention to the exacerbations, which, in the generality of cases, are not very severe, continue their exhibition unremittingly every two hours.

In relation to the *second*—the first evident signs of an approaching crisis are—twitching or rather working about the lips; uneasiness of the guma, indicated by ineffectual efforts made by the parched tongue to reach them; and the hand, which has lain insensible and motionless for some days, save from *subsultus tendinum*, will be feebly attempted to be raised to the mouth; a slight moisture bedews the tongue, appearing first on its edges, afterwards extending itself. Natural sleep, instead of unrefreshing drowsiness, precedes the favourable crisis; in which the patient, as if re-awakes to life; he looks cautiously and inquiringly about him; the tongue will be found moist round the edges; the skin warm, and covered with a gentle diaphoresis; the pulse, formerly scarcely a thread, beats sensibly and softly; in fine, the whole system appears as if to act under the agency of returning health. Afterwards by gradually diminishing the doses, so as, for a period, to hold the system under the mercurial stimulus; by the exhibition of light, but at the same time, nourishing diet; warm tonics, in which quinine ought always to form a part; gentle stimuli gradually increased; mild aperients; and, if possible, change of air, will be all that is necessary to carry the patient through a lengthened convalescence, in which the slightest error, irregularity,* exertion, or exposure, is seen to cause a relapse from which very few have power left to† recover,—or may induce diarrhœa, or dysentery, which may either retard or entirely prevent recovery. The absence of diarrhœa may always be looked upon as a most favourable and happy circumstance; when either does occur, each must be combated to the utmost of our power. If the calomel and quinine should be found to affect the bowels, we must restrain them by opium alone or in combination, &c.

In this class of diseases, which the natives call *souffra ourac*, the haykims bleed very profusely, use an infusion of rose leaves, or chamomile flowers, evacuate the bowels by enemata and syrup

* In one case, which we had subdued by very energetic measures, the patient, a marine, felt so perfectly well, that he rose from bed on the third morning and dressed himself; on attempting to cross the ward, he fell down in a faint; febrile reaction succeeded, which we failed in subduing, and death was the result of the patient's obstinacy.

† We are only aware of one case in which recovery from a relapse took place. It was in the person of the skipper of the Black-Eyed Susan, a powerful man; he very nearly sunk during convalescence from dysentery.

or linctus of roses; apply leeches copiously, and bleed on the recurrence of each exacerbation. They are far from successful in the more severe forms of the disease, and in the ataxoid they prove of no avail, resigning the sufferer to his fate, which, in a great majority of cases, if not always, terminates in death.

In concluding these remarks, we would mention that, after combating the febrile excitement local congestions, &c. by the means taken notice of, or others dictated to the observant practitioner, we must endeavour to obviate a recurrence by the exhibition of quinine. If the typhoid state supervene, or if it be our lot to treat the ataxoid, endeavour to rouse the system, rapidly sinking, by the stimulus of mercury; we must, from the moment that the system comes under its influence, we may indulge the hope of happy termination; but, as during the treatment, more mercury may have been exhibited than was sufficient to throw off the disease, or, in other words, to bring about a crisis, fearful cases not only of ptyalism, but of mercurial sloughing ulcers of lips, tongue, and gums, may be looked for. It must, therefore, be the anxious care of the practitioner to anticipate these, and to endeavour to counteract, so far as possible, an occurrence which will be looked on as his fault, and with which it will frequently be his pain to be reproached. He must not think, because ptyalism does not immediately appear, that no danger of such an occurrence is to be apprehended, for, with the gradually returning powers of health, will it be his misfortune to see it more and more develop itself.

Already I have dwelt sufficiently on the continuance of quinine during convalescence, for the purpose of endeavouring to obviate attacks of the prevailing endemic, the intermittent fever.

If the submaxillary or parotid chain of glands, in addition to their swelling, become inflamed or painfully sensible to the touch; leeches, followed by cold evaporating lotions, repeated and continued, must be immediately had recourse to—or if, from the size of the swelling, they threaten suffocation, deep punctures in several places ought to be resorted to without delay. They take some time to disappear, which circumstance may be assisted by warm stimulating friction. I am not aware of their ever suppurating.

V. Nervous Fever of Summer, with remarks on Coups de Soleil and Cerebral hyperæmia.—This fever is confined to the summer or autumnal months, whilst continued fever holds its sway, as already stated, principally during the winter. This disease may be called a “seasoning fever,” for individuals arriving during the months in which it prevails are, nine cases in the ten, sure of being attacked before many days have passed. Although severe and rather alarming to a stranger whilst it lasts, we would

say, unless when complicated with severe cerebral affection, it is, in as far as our experience has gone, devoid of danger.

The bowels will be found in all persons attacked to have been disordered for several days previous to the seizure, which is always sudden, devoid of any symptoms premonitory of its assault, and never ushered in with decided rigor or chills. Constipation, as it is a state which must be looked for in individuals living for a period under a high temperature, on substantial food, and not like the natives eating, during the summer months, principally vegetables, with large quantities of oil, forms the more frequent state, predisposing, we should say, to an attack, during the early months; whilst diarrhoea towards the latter part of July and August will be found to be the more prevalent state,—arising either from bilious congestion, or from the semi-putrid water in many cases obliged to be swallowed, in addition to the other causes unnecessary to be again taken notice of. In the first twenty-five cases, which occurred amongst the British, three only had diarrhoea, whilst the remaining twenty-two had had no alvine evacuations for two, three, or four days;—whereas latterly the diarrhoeas were more frequent; we found them so more abundant amongst the Turkish soldiery and natives. The immediately exciting cause is incautious exposure to the direct rays of the sun.

The following we present as a brief outline of this affection. In no case, as before-mentioned, was the febrile excitement ushered in by rigors or a sense of chilliness; a sensation of nausea, languor, headach, general debility, pain and weakness in the loins and lower extremities, being the symptoms immediately preceding the throbbing headach, suffused eye, lancinating pain through upper part of orbits, increased on motion of the eyeball, or on the eye being exposed to strong light, flushed face; dry, brown, furred tongue; clammy sensation in the mouth, offensive breath, great thirst, hurried respiration, hot, parched skin, pulse quick, and nervously sharp, averaging from the commencement 110 to 138; high-coloured offensive urine, pain existing on passing, and yielding, on standing, a copious lateritious sediment. This state continues for forty-eight or fifty hours, during which exacerbations are very evident towards evening, then gradually subsides in a diaphoresis, which, at first, is intermitting, and confined to the chest and upper parts of the body, becomes general, regular, and profuse, even extending, in some cases, to the soles of the feet; it leaves the patient in a state of great debility, with sense of fainting on raising the head from the pillow. The convalescence, when uninterrupted, is as rapid as the disease has been violent in its course; four or five days sufficing for the generality, and in three only was it prolonged to the eighth or tenth day after the disappearance of all febrile symptoms.

Such is the usual course of the disease in the generality of cases; but in a few there was, notwithstanding the high state of pyrexia, a diaphoresis from the very commencement, which continued throughout; yet in those the symptoms were as severe, and the suffering as great. Some had a short hacking cough, with disagreeable sensation of uneasiness, amounting in a few cases to soreness, in the trachea and bronchi, but disappearing with the establishment of diaphoresis; it was accompanied, at the same time, by gentle expectoration. The head symptoms in some amounted to a degree of soreness, which was sensible on moving the head or eyeballs, producing great irritability of temper and restlessness; others experienced epigastric tenderness, and pain over the region of the liver on pressure. The first symptom in some was vomiting of a highly bilious matter, mingled with the contents of the stomach; many were seized on mounting guard immediately after dinner, (*meridie*). In several cases the first diaphoresis was acrid and offensive.

Although such may be presented as a general outline of the disease, yet where we have a miasma or miasmata, be it or they paludal or otherwise produced, continually exerting a greater or less severe influence, we may look for it sometimes taking on the type of, or terminating in, one of the two diseases, recognized more particularly as the products of those influences, the remittent and intermittent. Such was found to be the case in a few instances; in one also, after a state of perfect apyrexia for twenty-eight hours, did a second attack similar to the first in its attack, course, duration, and termination supervene, from the person incautiously getting out of bed, and using exertion, contrary to orders strictly given. In none of the cases treated by us had we the misfortune to see it lapse into typhoid or any other unfavourable termination. In some cases, where the cephalic symptoms had been severe, there was found a delicate sensibility of the cerebrum, which existed for some time, requiring and demanding great care and attention.

The treatment pursued in all our cases, was, immediately after the seizure, unless emetics were necessary to relieve the loaded state of the stomach, to administer one scruple of calomel with a quarter of a grain of tartar emetic, followed two hours afterwards by an ounce of salts dissolved in xss. of water, ʒiii. of which were administered from time to time, obviating thereby, its ejection; if diarrhoea had pre-existed, castor-oil was preferred. After the bowels had been freely moved, assisted by enemata when necessary, a couple of ounces of the saline purging mixture were exhibited every hour or two, according to circumstances; thereafter the simple saline mixture, in similar doses, till such time as diaphoresis was fully established. The above sufficed in all for the reduction of

the febrile symptoms ; in those in which the cephalic symptoms, or pain on motion over the orbits existed and remained after the full effects of the contro-stimulating purging mixture had been tried, leeches were copiously applied and repeated,* and a pill of ten grains of calomel, and one of opium, repeated as circumstances demanded, were found sufficient, with shaving the head, and the application of cold evaporating lotions to relieve the former, whilst the latter readily gave way to the usual plans already reverted to.

As the termination presents itself, so must we treat it according to the principles already laid down. During the convalescence all that will be found requisite is to pay due attention to the secretions, more especially that of the liver ; gently brace the system by tonics, and avoid any exposure or exertion for some days subsequent to confirmed convalescence. As has already been repeatedly stated, the quinine ought to be freely exhibited after the state of apyrexia has commenced, so as to obviate, if possible, the supervention of the remittent or intermittent.

In many cases, after the exhibition of the large dose of calomel at the commencement, did sleep supervene, from which the patient awoke, with all the symptoms greatly mitigated. The calomel may be repeated after the bowels have been evacuated, but without the tartrate of antimony, with a view to endeavour to obtain the wished-for end. If the febrile symptoms be severe, great advantage will accrue in many cases from pursuing such a course.

1. *Coup de Soleil*.—If, to the disease just described, we add cerebral symptoms, amounting in some cases to furious delirium or raging madness, speedily followed by dissolution, we have before our eyes that disease called *Coup de Soleil*, or sun-stroke, so frequently met with in its varying degrees amongst travellers or visitants to those countries, who unguardedly expose the body, more especially the upper part, with head and neck to the direct rays of the meridian sun, resort to severe exercise on foot or horseback, toiling over marshy swamps from sunrise to sunset, hunting the quail, partridge, &c., and, from time to time, renewing their apt-to-be exhausted nervous energy, by frequent demands on the spirit-flask. A milder degree of this affection I have noticed in table a. Appendix, No. 5, under the head of

2. *Cerebral Hyperæmia*.—Of this affection we had several cases under our care, resulting from the causes above-mentioned. They were not, save in one case, attended with much febrile excitement, notwithstanding there was always an evident evening exacerbation, with increase of the affection. The biliary system was always found considerably deranged as cause or effect. The

* In some cases, whilst we hesitated, epistaxis took place, and afforded relief.

principal complaint is a soreness of the whole cerebrum, more especially of that portion over the orbital plates, which soreness is greatly increased on motion of the eyeballs, or slightest mental exertion, producing in some a degree of wildness about the eyes, and in others an inactivity, with inclination to drowsiness, or an irritability, with restlessness and peevishness. There are always restless nights, great thirst, and an offensive state of the mouth. Whether this be mere nervous excitement, or hyperæmia, properly so called, or whether it be sympathetic of the suffering of the rest of the body, or an idiopathic affection, we do not intend to decide. Suffice it to say, as regards the latter, it may exist as an idiopathic affection, and give rise to constitutional disturbance, or it may occur during, or supervene to, constitutional disturbance, but in either case, claiming for its origin the same exciting cause—solar heat, directly or indirectly applied.

In the treatment of the first of these two, to delay is equivalent to signing a death-warrant. It is necessary immediately to shave the head, to apply leeches to the forehead and temples, and to rouse into action the whole intestinal canal by the exhibition of brisk cathartics, premised by a scruple dose of calomel, assisted by enemata, and continued by the contro-stimulant purging mixture; then reduce the excited action of the system still farther by tartar emetic given repeatedly, but not to such an extent as to induce vomiting. Then should be given ten grains of calomel, and one of opium, and repeated every two or three hours, till sleep or quietness are induced, combined with such other means, as the urgency of the case may demand, or experience may dictate. In the milder form, the *hyperæmia cerebialis*, the same means must be had recourse to, but suited according to the peculiarities of the case.

VI. *Exanthemata*.—Under this head we are only to be understood to allude to variola, rubeola, and rosalia; leaving out of consideration the various other innumerable eruptive diseases, which will be found extremely prevalent in all parts, in both their acute and chronic forms, be they attended with fever or not, be they sympathetic of intestinal irritation—or the result more immediately of a disordered state of the skin, the whole of which, for so long is kept in a state of high excitement or irritability, assisted by the unwashed state of the bodies of the lower classes,* and the various other exciting causes too many to mention. There is only one other of this class of diseases, which we intend to mention at length. I refer to the plague.

* Amongst the better classes the bath is frequently had recourse to, more especially amongst the females, which latter pass whole hours there. One curious fact, which still prevails, we may as well mention here. After parturition the female does not consider herself clean or fit to mingle in society, till she has performed ablutio, which is done generally about the 14th day.

The three diseases before-mentioned pay their visits twice annually, taking the rainy seasons for the period of their predilection, they appear with the early part of them, and gradually increase in severity as they advance ; they are very general in their rage, attacking the young, the old, and the middle-aged ; and they are usually attended with great severity in their course, and fatality in their termination.

The natives have a very perfect idea of the first, which they call *jidri*, but the two last they seem to confound, and indiscriminately call them *chmeri*. They hold the whole triad in very great dread, and look upon, more especially, the first, with a degree of abhorrence equal to that which they entertain for the " scourge of the East."

Vaccination was some years ago introduced into the Lebanon range by two Frenchmen, Bertrand, father and son, who were (September 1841) residing at Ebey, a village several miles from Sidon. It was for a long period solely confined to them, but latterly it has been practised extensively by the accoucheur females, and native haykims, who perform the operation generally with a fine needle. The natives put great faith in it, and, as far as our observations went, always expressed great anxiety to have it performed, so as to endeavour at least to preserve their offspring from the effects of so lamentable a disease. The benefits that have resulted to communities from the introduction of this practice have not been so great as elsewhere ; but we must not judge hurriedly. In the towns we had an opportunity of visiting, very few of the younger and middle-aged classes of the community, were observed bearing stamped upon their countenances, those hideous and imperishable marks and deformities—which demonstrate that the elder classes of the community had not entered life under such happy auspices. They practise it generally in the second or third month. The Reiss of the Maronite Convent of the town, already so frequently mentioned, assured me that not above a very few cases of the *variola confluens* had been observed for several years. The appearance of the healthy urchins, with smooth countenances, of which many of their grand-sires could not boast, fully corroborated the statement made, I believe, in veracity. As already stated, the mortality is very great, and is principally amongst the youth from 14 to 22 or 23 years of age ; the very young and aged escaping with comparative impunity.

We would, before concluding these brief remarks, take notice of a variety of variola which sometimes occurs ; it may be either the result of a peculiar idiosyncrasy, or predisposition, or other circumstances combined may produce it ; it may with truth be designated its most malignant form. The febrile symptoms succeed

the premonitory with great severity ; the epigastric " fire " is almost insupportable ; the former settle down a little after the appearance of an eruption, on the fourth or third day, which is general, and in large irregular patches of a dusky scarlet ; the mucous membranes of the eyes and nostrils suffer materially, which seems to extend also to the frontal sinus, adding one other torment to the already afflicting state of the sufferer. After a short period the patches show here and there the variolous pustule, affording a certainty as to the true nature of the disease ; the powers of life begin to sink ; coma steals insensibly on ; the intestinal mucous membrane shows, by the copious offensive evacuations, that it has taken on a similar action ; the patches, assuming a petechial appearance, begin to slough ; bronchitic symptoms ensue ; and the patient hangs on till death puts an end to the conflict. This may take place independent of vaccination. We saw this form of the disease illustrated in the person of an amiable and worthy British merchant at Bairout ; he fell a victim to it in December 1841, and his memory will long be cherished by those who knew his value.*

VII. *Bilious affection.*— Under this head we include two very different and opposite states of the biliary function.

In the one, the secretion either does not take place, or, if it do, is prevented by spasm, gall-stones, or other impeding causes, from passing along the excretory ducts,—but becoming re-absorbed and entering the circulation, gives evidence of its existence by the tinge it imparts to the whole surface—the colour it gives to the urine, &c. &c.

In the other, the reverse is observed ; the biliary secretion is too abundant, and gives rise to diarrhœa, the *diarrhœa biliosa* of authors, dysenteric, or other state of the mucous membrane of the small and large intestines, conjointly or separately.

The former, an icteroid affection, was very prevalent both amongst the natives, and the British detachments, during the period of our residence at Jaffa. It was under this disease that his Highness, Ibrahim Pacha, laboured on his arrival at Gaza ; on which town he retreated, previous to finally evacuating the country. His Highness was very much alarmed at first, but we had the satisfaction of seeing him perfectly reinstated in health, before his last foot pressed the Syrian shore, as he embarked. To go into a lengthened detail, would be merely to describe an affection already well described at great length, in all its varying degrees of intensity, &c. by many authors. I subjoin, however, the following case, which, at the same time that it gives the appearance and symp-

* The natives treat this class of diseases as they do their fevers, seldom making use of any remedy, save the infusion of rose leaves ; the mountaineers confine their treatment to light clothing, and free exposure to the cool air.

toms the affection assumed, presents the treatment adopted. Out of the ten cases occurring, and inserted in table *a*. App. 3, nine occurred amongst the marine detachment, most of whom had suffered from fever previously at Bairout, Sidon, St Jean d'Acre, and D'jouni Bay.

CASE.—Samuel Smith, P. R. M., aged 28, of a delicate habit of body, and sickly appearance, with white of eyes and whole surface tinged with yellow, was admitted to hospital this morning, (January 22d), having been complaining for several days of want of appetite, sickness at stomach, irregular bowels, clammy sensation in the mouth, which, on awaking in the morning, is very bitter and offensive; the tongue is loaded but moist; there is stupid headach, preventing him from following out any train of ideas; the urine is very high-coloured; and his stools, he says, are, and have been for some days of a white appearance, and of a gummy or waxy consistence; there are pain and weakness in the loins and lower extremities, which last, he says, he feels unable to support him, giving way always at the knees; he complains of pain in the right shoulder, and over the region of the liver when pressure is made; cannot lay with ease upon his left side; breathing a little constrained; a full deep inspiration cannot be performed without difficulty; skin feverish; pulse sharp, 120; thirst considerable.

Twelve grains of calomel with one-fourth of a grain of tartar emetic were ordered to be taken immediately; and after the lapse of two hours, one ounce of Epsom salts.

Vesp. Feels a little relieved, the medicine having operated; the evacuations are found to present the appearance detailed above, and looked as if half-digested; the urine is very high coloured, and excites considerable irritation on passing along the urethra. Now says that he has laboured under uneasiness in the right side for the last three months. 23d, This morning the fever is, if anything, increased; there are great thirst, considerable heat of surface, sharp headach, dry tongue, very hot breath; but the pulse, although a little sharper, pulsates as yesterday.

In the evening he was much in the same state, bowels several times opened, stools of same colour and consistence. Six grains of calomel and one-fourth of a grain of tartrate of antimony were directed to be taken immediately and repeated at bed-time.

24th, Has passed a better night; slept soundly for some time; pulse 90, less sharp; skin cooler and gently bedewed with a warm diaphoresis; headach diminished and altered in character; tongue moist; thirst not so great; no alteration in stools or urine.

R. Mass. Pilul. Hydrargyr. gr. xv. Tart. Ant. gr. ¼ M. ft. massul. dividend. in pilul. iij. una ter die repetend.

25th, Feels greatly relieved, the whole symptoms are considerably ameliorated; the tongue shows a disposition to clean; the

bowels once open during the night; *Contin. Pil. Hydr. ut heri prescript.*—*Hab. Ol. Ricini* ʒvi. *H. s s.*

26th, The bowels have been very freely opened this morning early; the evacuations show by their change of colour that the bile is again beginning to return to its natural channel; the tongue continues to improve; the urine, both less coloured and less irritating. *Omitt. medicin.*

27th, Feels a little easier; the bowels act readily; and the complexion is a little clearer. *Rept. Pil. Hydragyr. ut 24th prescript. et Ol. Ricini* ʒi. *mane habeat horâ sexta.*

30th, Feels a very sensible improvement; the bowels are acting easily; the evacuations are daily assuming a more and more natural appearance, as do also the urine, and upper parts of the body; taste in mouth in the morning almost gone; tongue cleaning rapidly; pulse, soft, and natural, (80,) as is also the skin; appetite returning; he can now bear pressure over the liver, but experiences slight inconvenience, if it be hard.

31st, *Vesp. R. Pil. Hydr. gr. v. H. s. s.*

R. Sulphat. Magnes. ʒvi. M. S.

Feb. 1st, meridiæ, Improving rapidly; the evacuations produced by the medicine are almost natural; the eye is clear, but the complexion more slowly returns to its healthy aspect; has considerable appetite, but feels the food heavy.

R. Infus. Gentian. ʒviij. Sulph Magnes. ʒvi. Signa. ʒi. mane meridiæque sumend.

Under the use of this tonic, with one or two doses of castor-oil, and the exhibition of one of the following pills, from time to time, (*R. Mass. Pill. Hydr. gr. xij. Pulv. Rhei gr. xxiv. M. ft. in massulam cum Acac. Arab. Sol. divid. in pilul vi. æq. magn.*); he was completely re-established, and on the 11th of February was discharged to his duty.

In some cases it will be necessary, according to the probable exciting causes, to adopt other means—as strong opiates, counterstimulants, and local depletion, to relieve the anguish of a passing gall-stone, to obviate any tendency to inflammatory action in the biliary ducts, to relieve such if it already exists, or to combat a frequent concomitant epigastric tenderness and irritability of stomach.

The other form before-mentioned, or that in which the liver performs its function irregularly, or, in other words, when the bile, not only is secreted in greater quantity than natural, but of a much more acrid and irritating quality, producing bilious diarrhoea, as already stated, with its consequences; it is too well known to require any description. We would merely remark, however, that very frequently we find it accompanied with great irritability of the stomach, and pain or tightness surrounding the chest. This affection, in those countries where the exciting

causes always exist, may vary from mere irritation to actual inflammation of the hepatic structure in its more mild forms. It is far from difficult to combat, but it is not so easy to prevent a recurrence. In the generality of cases, a few doses of the blue-mass, followed by black-draught, or saline cathartics, mild or strong, according to circumstances, will be found to be all that is demanded; but when it assumes a more severe form, then we must have recourse, without delay, to the free application of leeches; to the exhibition of calomel and opium, and antimony; followed by sinapisms, made more stimulating by the admixture of a little terebinthinate oil; and such other means as the exigency of the case, or the severity of the symptoms may demand; putting more trust in the first part of the treatment, the antiphlogistic remedies, calomel and opium, and tartrate of antimony—than in the calomel alone. If in its milder forms, it shows a tendency to recur, all that we possibly can effect is to point out the necessity of the patient duly regulating the diet; for much more must depend on himself, than on the medical man; he must abstain from stimuli, heating or highly spiced food; and must have recourse to the occasional exhibition of alterative pills, followed, as necessity may demand, by a mild aperient. We know of no one better suited for this case, than the seidlitz powder, to which, to increase its effect, &c. a drachm or two of Epsom or Glauber's salts may be added. The former is the best. The use of tartar emetic ointment, in obstinate and long-continued cases, and the sponging the whole surface daily with cold water, are beneficial.

VIII. *Diarrhœa*.—This affection, arising from so many causes, and assuming so great a variety of appearances, is always more or less prevalent; but the latter part of summer, the autumn and early part of winter, will present it in its greatest variety and its most severe forms.

It is not our intention to enter at length into all the varieties every where and in every country met with, or into all the causes exciting those various kinds; whether they arise from constipation or bilious derangement,—or may be idiopathic or consecutive,—or characterized by peculiar stools giving rise to the numerous divisions and subdivisions into which this disease, which in its course may present one or all of them, have been devised. As regards the consecutive and colliquative diarrhœa incidental to the pyrexial diseases, and the bilious, enough has already been said under their respective heads; that produced by costiveness suggests its own cure; but there are two others which are frequently met with, and which we would beg to notice a little particularly. They are the catarrhal of winter, and the atonic of autumn.

(a.) The *catarrhal* diarrhœa, or *catarrhus recti*, characterized by a discharge not unlike that pituitous one which accompanies catarrh and coryza, is both troublesome to the sufferer, and per-

plexing to the medical practitioner. It recognizes various causes for its production, but those under our care were produced in one case, by long-continued costiveness,—the others, from exposure to wet in the saddle, the clothes having been perfectly moist for several hours. The patient has all the sensations and symptoms of diarrhoea, accompanied with burning sensation in the lower part of the rectum, and continual tenesmus. The evacuations when examined are found to be nothing more than a collection of mucus, which may be either pure, slightly tinged with blood, or red, like red currant jelly. It may be *en masse*, or in shreds and threads, according to the severity or extent; which again may either surround, as by an envelope, or succeed to the expulsion of, the hardened faeces, if costiveness exist. The heat in the lower part of the rectum, to which it seems to be confined, and perhaps it may more properly be called *catarrhus recti*, varies considerably; after a few days it passes off, the disease, as if assuming a more chronic form. It may be accompanied by considerable febrile excitement, or may exist without any constitutional disturbance; relapse is very frequent, and may occur from the slightest exposure or irregularity of diet, &c.

The sensation may be so severe at first as to demand the application of leeches *ad anum*, followed by the frequent use of tepid ablution, and warm emollient enemata in small quantities. The bowels are to be well cleared out, and kept in a fluid state by small doses of castor-oil, to which a few drops of tincture of hyoscyamus ought always to be added. A pill composed of blue pill and Dover's powder, to which one-eighth of a grain of tartar emetic may be added, should be exhibited at bed-time, and an opiate suppository introduced before the patient feels inclined to sleep. After the heat has disappeared, if the discharges be mingled with very little blood, a slightly stimulating injection, to which tincture of opium ought always to be added in small quantity, may be used with advantage. It is scarcely necessary to remark, that the horizontal position should be observed, and only diet of the mildest kind allowed for the first few days.

(b.) The *Atonic Diarrhoea*, occurring in autumn, the result or evidence of a generally relaxed and debilitated frame, in which the whole intestinal mucous membrane sympathizes. It was very prevalent amongst our men, after having been for some time exposed to the night air, sleeping on the ground, drinking unwholesome and almost putrid water, and inhaling an atmosphere tainted with the exhalations proceeding from half-buried bodies hurrying on to decomposition.

The entire system bore decided evidence of the whole vital powers labouring under the influence of some depressing causes, or poison harbouring there; the bowels, from their debilitated and irritable state, demonstrated that they sympathized most fully

with the general condition. Individuals, now weakly and thin, but who previously bore the evidence of robust health stamped on their countenances, were scarcely able to crawl, and whilst they pulled up their trowsers and pushed out their wasted and attenuated limbs, would mournfully say, "this disease is too strong for me;" and we have seen a tear trickle down the cheek of some, who perhaps never wept before in their lives. The appetite was gone; the pulse soft, easily compressible and as easily excited, 90 to 110; the eye sunk in the socket, and cheek bones standing boldly out, showed that absorption had done its work. The dejections varied in appearance, being more or less mucous, more or less dysenteric, but in all cases mingled with portions of undigested food; for no sooner was the latter swallowed than the patient was harassed with continual, and in many cases, ineffectual calls, till such time as it had passed from him. The skin was dry, and nightly exacerbations frequent. In some cases tenderness was observed over the intestines, principally above the sigmoid flexure, which in many cases had acquired a morbid sensibility, giving notice of substances as they passed along, and pain on pressure.

The great object here to be obtained was the controlling the discharges, which were gradually weakening the remaining powers, and endeavouring to brace the system generally with warm tonics. The first end was obtained by the administration of the mercurial pill and Dover's powder, * *ipecacuanha*, *hyd. cum creta*, crude opium; and the second, by infusion of gentian, combined with gentle aromatics and small doses of opium or hyoscyamus; rice or sago diet, to which a little wine was added, rice-water for drink; forbidding tea, cold water, or milk and water, which frequently counteract the effect of remedies, &c.; after a time, a mixture of rhubarb and magnesia in combination with aromatics and opiates, given in small doses twice or thrice a-day; fresh eggs, fowls, &c., and when the system can bear it, cold sponging or bathing; the bowels may be roused from their lethargy by the application of sinapisms frequently; vesicatories being inadmissible in so debilitated or depressed a state of the nervous system. We need scarcely add, immediate removal from the place to be indispensable.

This may terminate in one of the worst forms of dysentery

IX. *Dysentery*.—This, the offspring more particularly of warm climates, chooses autumn for the period in which it holds its reign, exerts its greatest sway, and stamps on many its seal of death, which either soon carries them off, or leaves them to drag out for months an existence, than which nothing can be more replete with suffering to the victims, or cause greater mental anxiety to the medical attendant.

* This combination we have seen produce griping and purging, probably depending on some impurity of the latter, which we have seen also alone produce it to a distressing degree.

This disease may occur in an acute, subacute, or chronic form, either of which may be distinct, or succeed one another. It may exist without fever, may give rise to constitutional disturbance, or may occur as a complication during febrile excitement; it may be a primary affection, or it may succeed diarrhoea, between the termination of which last and the commencement of it, no very distinct line of distinction can be drawn; it may occur in a constitution, comparatively speaking, healthy; or it may arise during convalescence from fever. Finally, it may occur sporadically, or exist epidemically; but my experience inclines me to view the doctrine of its contagious nature with great doubt, if not entire disbelief; and after a careful perusal of all that has been written and brought forward, for and against the contagious nature of dysentery, I am, from experience, inclined to deny it such a power *in toto*.

I shall briefly mention the various forms of this disease, as it has been presented to notice, under the three heads of subacute, acute, and chronic.

1. *The subacute form*,—which is at first barely more than what might be very justly called a catarrh of the intestinal mucous membrane, may pass off, readily yielding to medicine, in a few days,—or it may become more severe, assuming the character of the acute, with febrile symptoms more or less intense,—or stealing insidiously on, pass into the chronic form. This subacute disease may exist for some days before it is brought under the medical person's observations; for, being so slight, it is regarded as nothing by the individual, till, perhaps, observing what has passed from him, or his bowels remaining rather costive, he applies for relief. He is then found to have not felt well for several days; is subject to chills, and especially to cold feet; has lost his appetite—is inclined to be lazy and low-spirited, and greater or less anxiety is depicted in the countenance. The tongue is moist but furred, and a little red; there is thirst,—cold or hot fluids giving rise to colic, which may occur repeatedly during the day or on the repetition of the draught. The nervous energy seems lowered; the slightest exertion produces diaphoresis, which is exhausting and chilling; the stools, he says, are “nothing to speak of,” but “I've eaten nothing for some days;” he feels restless and heated at bed-time, there being a nightly exacerbation, which goes off about 4 A. M., and permits a little sleep; the pulse is irritable and easily excited. Pressure over the liver and intestinal tube may give rise to sensations varying from uneasiness to actual pain; the lower part of the colon will be found hard; urine high-coloured; the evacuations, which are frequent, are either a few scybala with mucus, or mucus mingled or streaked with blood. This may exist for a varying period; but eight or ten days will be found sufficient to relieve it.

After the first occurrence, however, relapses are easily induced, and, after a time, resist the curative means, and pass into the next or the chronic form.

2. *Acute Dysentery*, or dysenteric fever, ushered in by chills, and preceded by an irregular state of the bowels, will present itself in its attack and course much as follows. The first symptoms are want of appetite; feeling of languor, nausea, general uneasiness, chilliness of the whole surface; frequent desire to go to stool, without voiding anything, save a little wind, a few scybala, alone, or mingled with mucus, which last will sometimes be found streaked with blood; the mouth is clammy, and there are nightly exacerbations, preventing rest, and rendering the calls to stool more frequent; the desire to go to stool becomes more pressing and urgent; the patient more restless and irritable, there is anxiety in his countenance, and depression in his mind; the tongue loaded, and breath offensive; the skin throughout the day is bedewed with a clammy diaphoresis, which is sometimes offensive; the pulse variable, but, whether more or less accelerated, always agitated. This state is shortly, or after two or three days, succeeded by a febrile reaction, which may vary considerably in degree; the colicky pains, formerly troublesome, are now tormenting; the thirst great and harassing; the tongue, whilst it is red round the edges, with its papillae elevated and glazed, may have its centre coated, furred, and moist; the lips are parched, and breath hot; the skin is hot and burning; there is severe headach; flushed face; anxious breathing, with half-suppressed sighs; sharp vibratory pulse, 90 to 140; considerable distension of abdomen; frequent calls to stool, but the efforts are fruitless, or there is a little mucus, streaked with blood, or interspersed with scybala; there is pain, or exquisite sensibility over a greater or less portion of the abdomen, which feels doughy, and to the hand much warmer than the other parts of the body; the knees are drawn up, and the sufferer lies upon his side, with the chin meeting them, or tosses from side to side, trying all positions, to endeavour to obtain a moment's respite; the calls to stool become more and more urgent, the paroxysms of pain more severe and longer; and the pain appears sometimes to travel the whole extent of the intestinal tube; the tenesmus, ever present, is tormenting; the straining, severe on the patient, is painful to witness, causing protrusion of the lower gut, from which often issues pure blood, affording no relief; a sensation of something requiring to be expelled exists, continually compelling the patient to remain on the close stool for hours, from which he can scarcely be persuaded to withdraw himself; the urine, small in quantity and high coloured, is expelled in drops; the anxiety of the countenance and supplicating expression of the eye increase; the mental depression and irritability become greater; the nightly exacerbations are more severe, and with them an increase to the already nu-

merous calls; pure blood is now passed, or shreds of mucus or plastic lymph resembling membrane, showing the intensity of the action; or gangrene supervenes, the pains cease, and death closes a scene of dreadful suffering; or the action subsides, warm diaphoresis bedews the formerly burning surface, which now becomes soft and relaxed; the intestinal tube becomes composed; the alvine evacuations show a tendency to return to a natural appearance; the breathing is fuller and deeper; composure and quiet resignation take the place of anxiety and mental despondency; the pulse becomes fuller and softer; the tongue improves in appearance, and refreshing sleep succeeds excruciating pain, and exhausting febrile restlessness,—all indicating that a happy change has come over the disease, and that there is a prospect of returning health; or it may subside in part, and pass into what I am next to describe,—chronic dysentery.

This severe form of the disease may terminate life in a very short period. A not unfrequent cause of the most severe form of this disease will be found to be unguardedly eating ices whilst the system is excited from violent or active exercise under a powerful sun.

The inflammatory action may be confined to a small portion only, or it may affect the whole of the colon; and at its early stage, from symptoms and sensations we may safely infer that the small intestines also, if not actually inflamed, are in a state of considerable irritability; it may terminate in resolution, or a return to healthy action, in ulceration, gangrene, &c. The liver may suffer considerably during the attack, or subsequently undergoing various alterations and other complications; the last is more frequently observed.

8. *The Chronic Dysentery*, as before stated, may supervene on an attack of long-continued or oft-recurring diarrhoea; succeed the acute, or the subacute, which, slowly advancing, at first resembling the mucous diarrhoea, but gradually and insidiously creeping on, develops itself in its true light and force, or it may occur during convalescence from a fever—from the slightest irregularity, exposure, error in diet, or undue attention to the secretions. I saw in one case the disorder reproduced by eating one-half slice of toast; the whole symptoms reappeared within one hour after it was swallowed, and the individual very nearly fell a sacrifice to his foolishness and obstinacy. In the latter case, or when it occurs during convalescence, there is an acute stage, which is rarely above a few hours in duration. The disease, when formed, presents itself much as follows.

The countenance appears haggard, and there is a supplicating look; the person looks weak, and cannot walk without support; the skin is cool and damp, as if covered with an oily or greasy

sweat, and after a paroxysm of pain it will be observed standing in large drops on the forehead, whilst anguish and despair are strongly depicted in his countenance; the tongue, bright-red, or scarlet—round the edges is glazed, and often chapped, whilst the centre conveys the idea of having been scraped from before backwards; it may be dark, white, brown, of various tinges, or black; the appetite is gone, the desires are capricious; the breathing, anxious and anhelating, is oft assisted by a half-drawn sigh; the pulse sharp and irritable, 120 or 140; there is pain on pressure over a varied extent of the colon. The transverse arch and descending seemingly suffering first and most; when the disease is partial I have found the part above the sigmoid flexure of the colon to be the principal seat. The abdomen, doughy or flatulently distended, adds to sufferings already sufficiently great; the paroxysms of pain, which are ever and anon returning, scarcely permit a moment's tranquillity. The evacuations vary in appearance in the different stages of its progress; they may be watery, tinged with feculent matter, having shreds of mucus, or quantities of mucus, resembling flocculi, *en masse*, or, floating in red-coloured fluid, or slimy, pitchy, greenish, interspersed with portions or shreds of mucus, bloody, purulent, sero-purulent, or sanguineo-purulent,—or any of the former mingled with a little feculent matter; the odour, always offensive, is very characteristic. Hectic fever, in place of the nightly exacerbations at first, frequently returning, contributes to exhaust; causing, at the same time, a recurrence of paroxysm after paroxysm, exciting evacuations; the patient becomes more and more irritable, more and more anxious, flatulent distension and flatulent pains moving amongst the bowels, torment him exceedingly, œdematous swelling of the lower extremities takes place; pus and blood, pure or mingled, in large quantities, are frequently discharged, or pass from him involuntarily or unwittingly; aphthæ attack the mouth and palate, and, extending down the œsophagus to stomach, cause a burning sensation, as if the whole were on fire, creating a desire for “even a mouthful of cold water,” which, if swallowed, aggravates much his sufferings, rendering the scene, which is soon to close, more truly lamentable; hectic flushes and discharges of pure blood more frequently recurring, render the exhaustion extreme, and the sufferer, after a few ineffectual struggles, worsted, yields the contest, or, becoming comatose, quietly passes out of existence.

A more truly lamentable form, and one more void of hope, presents itself as a sequence to what we have described, as “*atonic diarrhoea*.” From this, many suffered in the retreat of Ibrahim's army, and were left to die on the road; a few, on whom the disease had not yet exerted all its strength, were permitted to arrive at Gaza. Never shall we have obliterated from our memory the poor objects there presented

to our eyes during the embarkation of the sick and wounded. The road from the town, over a heavy sand, to the beach, presented numbers dragging their limbs slowly along, supported by their wives or fellow-comrades in distress, who knew not how soon they themselves would require to look for that support they could scarcely give. Others more exhausted yet, in whom the hope of seeing their native land was strong, laid on donkeys, had their attenuated limbs dragged over the burning sand. Many died; their comrades scratching aside a little sand, laid them down, and having performed the last offices, and chaunted a short hymn, hurried to the beach, leaving the poor remnants of the companion of their many toils and hardships, to be dragged from the place where they had left them, and devoured ere another sun had risen, by the night-prowling jackal.

In the subacute we consider the membrane to present the self-same appearances and condition as the mucous membrane of the nostrils, or that of the respiratory organs does, when suffering under an attack of coryza in the one case, or mild bronchitis in the other; congestion from the debilitated or relaxed state of the organic nervous system; hence of the capillary tissue, pre-existing—fully borne out by the character of the symptoms and nature of the discharge; we might justly term it an extended *catarrhus recti*; the difference between the two exist only in extent, or rather position; the latter, in the first instance, being confined to the rectum or to its lower part only, whereas the former prefers the colon, and, we might add, the lower part of the descending colon more particularly.

In the acute we have violent inflammation of the mucous membrane, partial or extended, forming colitis, perhaps the most appropriate term; it may be said to resemble an acute attack of bronchitis and bronchlemitis, which may be so severe as ultimately to form plastic membranes, taking the tubular form of the intestines which are often discharged in that form; or, like the former, it may be characterized by mucous shreds only, being, as the mucous discharge in it, the result of the inflammatory action; and in the last or chronic, we may expect from the symptoms, &c., if pathological investigation had not already brought them sufficiently to light—capillary congestion, the result of chronic inflammation, abrasion, or ulceration, with thickening, induration, or perforation, either one of which may be confined to a small portion, or extend considerably. In fine, the liver will be found, more particularly in the chronic, to present many lesions, the result of long-continued congestions, subacute, acute, or chronic attacks of its two capillary systems; be they the effects of sympathetic action or of idiopathic disease.

Treatment.—In speaking of the treatment, I shall merely offer a few remarks on each variety.

Subacute.—In this form little more is required to be done than to evacuate well the bowels, and by the exhibition of a few sedatives, alteratives, &c., allay the intestinal irritation; endeavour to induce healthy action of the skin, and bring back the mucous membrane to its normal state. The fully evacuating the intestinal tube is of the very first importance, for the colon will, in the generality of cases, be found to be loaded with impacted feces, which, if neglected to be removed, not only serve to prolong the irritation, and encourage the disease, but frequently prevent our therapeutic agents from affording the desired effect; hence a very probable cause of many valuable remedies having unjustly fallen into disrepute. We must not be led, from the presence of diarrhoea, to harbour the idea of such a state not existing, for it will frequently be found to be the result of it. The liver, as has already been stated, is in a state of congestion, and, if it be not early in the disease relieved, will prolong the sufferings, and may re-excite the disease at the moment we feel happy in the thought that we had overcome it. Again, the skin demands our particular attention, and in our curative efforts we ought to keep our eyes directed towards it. The best purge that can be administered is calomel (in grs. x. or grs. xv. doses,) followed by castor oil, to which half a-drachm or a drachm of the tincture of hyoscyamus may be added, to prevent the tendency it often has to produce griping, and assisted by a demulcent enema, which ought always to be exhibited some time previous to the expected operation of the oil. ‡ The bowels being well cleaned out, the feet immersed in a foot-bath, and Dover's powder, alone or in combination with blue pill, at bed-time, and repeated in two hours, if requisite, with abstinence from everything save rice-water, lintseed tea, tapioca, sago, &c. will be found to be all that is necessary in the majority of cases. When the symptoms are more severe, then recourse must be had to local depletion, following the course of the colon, assisted by warm fomentations, enemata, and the exhibition of a pill of calomel and opium, repeated every two hours, till some effect be produced; the bowels must be cleaned out after the lapse of a couple of days, with castor oil, or a little rhubarb taken on the empty stomach in the morning, and followed by a rather large dose of opium, with a view of allaying any irritation which may have been excited; such a mode varied a little to suit circumstances, with the assistance of sinapisms, &c. will be found of advantage in the treatment of the more severe subacute attacks.

Acute.—In the acute attacks,—if without pyrexial excitement in the first instance,—or if febrile symptoms are eventually added, we have before our eyes a disease in which every minute lost in combating it, takes away from the probability of a

happy and favourable issue attending our endeavours and efforts. We have a disease to overcome in which violent inflammatory symptoms exist, and demonstrate themselves by evidences too plainly visible and obvious to be misunderstood.

Our first attention must be, as stated in the subacute, directed to evacuate the large intestine, especially when it is felt like an irregular corded mass, by the means already recommended, assisted by the free application of leeches to the abdomen; the bleeding subsequently must be encouraged by the application of flannels wrung out of warm water. During the temporary state of exhaustion consequent on these remedies, a large dose of laudanum ought to be administered, which, by its powerfully sedative effects, will prevent reaction from taking place. But we must not reckon upon such being produced by the quantity administered, for oft will it fail; we must watch steadily, and as soon as we consider a time sufficient for it to have demonstrated its effects has elapsed, we must repeat it, giving always the patient the benefit of our doubts—or, what perhaps is better, the administration of the combination of calomel and opium frequently repeated, and assisted by a small bland enema, to which one or two drachms of liquid laudanum may be added, and by the application to the abdominal parietes of flannels wrung out of a hot infusion of tobacco leaves or crude opium. As the enema is apt to be rejected, it ought to be administered in the mildest manner possible; a warm soft towel should be kept held to the anus for some time, and the patient induced to endeavour to resist nature's calls; the irritation at the verge of the anus must be relieved by either a suppository, or by smearing the part with an ointment of any of the preparations of morphia. By persevering in those means, which may be altered, repeated, or modified, to suit varying circumstances, and by pushing on in small doses the calomel, (always combined with opium,) so as to make the system feel its stimulus; clearing out the bowels gently from time to time, every second or third day at latest,—watching the liver, which, although not very frequently the case in this species, yet may take on inflammatory action—and confining the diet to bland demulcent articles, in which acids ought never to be mingled, or amongst which ought tea or cold water never to rank, we may trust to pilot our patient to a safe harbour. After the inflammatory stage has been subdued, great advantage will result from the application of sinapisms, and by the wearing of a broad flannel roller for supporting and keeping warm the abdomen and its contents. This will be found to be equally serviceable in the last, and in diarrhoea of every description, more especially in those whose immediate exciting cause is cold or exposure to damp. During the convalescence, great attention must be directed to the state of the secre-

tions; the food confined to the blandest and mildest articles of diet; the system generally braced by mild warm tonics; and exposure to cold, damp, or the direct rays of the sun, or any irregularity in exercise, diet, &c. must be sedulously avoided; for in all cases, from the mildest to the most severe, the lining membrane of the large intestines will be found, whether it suffer more or less, to be in a state of extreme delicacy and irritability, requiring the frequent exhibition of opiates, or their combination with tonics, a plan which will be found very advantageous; the best alterative is a pill composed of blue-pill and rhubarb, taken at bed-time, and repeated as circumstances may demand.

Chronic.—In this stage of the disease, we must study minutely and carefully the varied symptoms, &c., and adapt our means to the end desired;—whether to subdue the chronically enlarged state of the vessels; to arrest the gradually advancing insidious inflammation; to control the exhausting discharges; to brace the debilitated condition of the whole frame; or, if abrasion or ulceration have supervened, to endeavour to induce cicatrization by the therapeutic means in our power. The bowels must be gently cleaned out from time to time by castor-oil, to which either tincture of opium or hyoscyamus must be added;—for, collections of feculent matter, &c. will be found to form or collect in the intestines aggravating symptoms and increasing pain. Leeches must be applied to relieve either congestion or a recurrence of subacute inflammatory symptoms. Calomel and opium should be exhibited in small doses during the day; demulcent enemata frequently, with one at bed-time, containing a large quantity of laudanum; the severe tormina must be relieved by the application externally of either of the infusions already spoken of, or by the exhibition of laudanum. After the more immediate evidences of irritability or actual inflammation have been subdued, the demulcent enemata are to be changed for those containing sulphate of zinc, sulphate of copper, sulphate of alumina, or acetate of lead, opium being always added to them; these ought to be administered in a very weak and diluted form at first, so as to ascertain the exact state of the membranes, and may be gradually increased subsequently; and to make their application more beneficial, and their action little impaired by repetition, we should alternate them with an unmedicated one; sinapisms are to be applied to the inner part of the thighs or legs, or in cases of great emergency, a large vesicatory to the abdomen itself. This last, if possible, ought to be avoided; for its effects are attended frequently with very great inconvenience to the patient. As the calomel and opium seems to lose its effect, or the state of the patient does not seem to advance under its continuance, one of the following combinations may be tried, and changed again as circumstances may de-

mand; calomel and rhubarb, calomel and Dover's powder, blue-pill, and Dover's powder, Dover's powder alone, ipecacuanha, the last with rhubarb or calomba, acetate of lead and opium, small doses of tincture of rhubarb, &c. But our great object must be directed to bring the shattered powers of the system gradually up by the stimulus of mercury, and this will be more effectually accomplished by small doses frequently repeated, than by large doses combined with friction, &c. As the powers seem to yield, and hectic fever is superadded, we must administer gentle stimuli, and light, nourishing, unirritating diet, to which wine may be added, as circumstances may seem to call for it. When the patient has strength to bear it, great advantage will be derived from the early application of the tartar emetic ointment, which may be made more powerful by the addition of the bichloride of mercury. Salivation as an evidence may be looked for, but it should be avoided, if possible; for the curing of the disease does not depend on the quantity of mercury swallowed, the profuseness of the salivation, or the rapidity with which it may be produced, but, on keeping up the certain beneficial mercurial stimulus, till such time as the system, assisted by other means, may rally. After the favourable change has taken place, we must brace the canal by warm tonics, confine the diet for a period to bland and nutritious articles, insist upon change of air and climate if possible, avoiding most sedulously any irregularity or error of diet, undue exposure to great heat, &c., and, as already stated, keep the feet and the abdomen warm by flannels, applying to the latter a sedato-stimulant embrocation for some time subsequently.

(To be continued.)

ART. IV.—*On Asthenopia, or Weak-sightedness*. By WILLIAM MACKENZIE, M. D., Surgeon-Oculist in Scotland in Ordinary to Her Majesty the Queen, Lecturer on the Eye in the University of Glasgow, and one of the Surgeons to the Glasgow Eye Infirmary.

§. 1. *Specific character*.—By asthenopia is to be understood that state of vision, in which the eyes are unable to sustain any continued exercise upon near objects; although the patient, on first viewing such objects, generally sees them distinctly, although he can employ his sight for any length of time in viewing distant objects, and although the eyes appear sound.

§. 2. *Synonymes*.—Asthenopia (from *a privative*, *asthenos*, strength, and *opsis*, the eye,) seems the most convenient, if not also the most appropriate, name for the disease forming the subject

of the following remarks. It is the name employed in the journals of the Glasgow Eye Infirmary. Taylor* distinguishes this disease as the fourth species of *debilitas visus*; and notices, in the following passage, the chief characteristic of the complaint, as pointedly as any succeeding author. "Dantur exempla, ubi statim ab initio lectionis, et post eam, litteræ confuse permixtæ videantur, et hinc legentes a lectione prohibeantur, quod etiam acu subtili nentibus, vel aliud quodcunque negotium, ejusmodi longam axeos oculi directionem certum versus objectum quoddam requirens, tractantibus, accidere solet." In our own language this disease is generally termed *weakness of sight*, or *weak-sightedness*; in French, *affaiblissement de la vue*; † in Italian, *debollezza di vista*; and in German, *Gesichtsschwäche*. ‡

Mr Tyrrell§ speaks of this complaint under the vague denomination of *impaired vision*; while Mr Stevenson|| calls it *dulness of sight*, a translation of the Greek *amblyopia*, and of the Latin *hebetudo visus*, both of which appellations are not unfrequently applied to this disease, but are more generally employed to signify a degree of amaurosis, as well as, or along with, the affection now under our consideration. This disease is the *amblyopia a topica retinae atonia* of Plenck; ¶ the *amblyopia nervosa* of Beer.** With a formidable enumeration of no fewer than ten varieties of the disease, Jüngken †† has considered it under the name of *hebetudo visus*.

Referring to one of the exciting causes of the disease, and fixing at once on its seat, Mr Lawrence ‡‡ terms it *affection of the retina from excessive employment*; while Scarpa, §§ adopting a particular explanation of the symptoms, denominates it *debollezza di vista per stanchezza di nervi*; i. e. *weakness of sight from fatigue of the nerves*. In the reports of the Bristol Eye Infirmary, this disease is set down as *debility of the retina*; while Mr James J. Adams||| has described it under the name of *muscular amaurosis*.

Dr Bonnet¶¶ gives this disease the designation of *disposition*

* Nova Nosographia Ophthalmica, §. 189, p. 51. Hamburgi et Lipsiae, 1766.

† Wenzel, Manuel d'Oculiste, Tome i. p. 7. Paris, 1808.

‡ Das Auge, vom Professor Beer, p. 64. Wien, 1813. Helling's Handbuch der Augenkrankheiten, Vol. i. p. 82. Berlin, 1821.

§ Practical Work on the Diseases of the Eye, Vol. ii. p. 25. London, 1840.

¶ Weakness of Sight, or Morbid Sensibility of the Eye, p. 16. London, 1830.

¶¶ Doctrina de Morbis Oculorum, p. 188. Viennae, 1777.

** Lehre von den Augenkrankheiten, Vol. ii. p. 34. Wien, 1817.

†† Lehre von den Augenkrankheiten, p. 780. Berlin, 1832.

‡‡ Treatise on the Diseases of the Eye, p. 566. London, 1841.

§§ Trattato delle principali Malattie degli Ochi, Vol. ii. p. 241. Pavia, 1816.

||| New Operation for the Cure of Amaurosis, Impaired Vision, and Short-sightedness, p. 12. London, 1841.

¶¶ Annales d'Oculistique, Tome vi. p. 72. Bruxelles, 1841.

à la fatigue des yeux; while Dr Pétrequin,* occasionally styling it simply *lassitude oculaire*, has also invented for it the name of *kopyopia*, from *κόπος*, *fatigue*, and *ὤψ*, *the eye*.

§. 3. *Symptoms*.—In many cases of asthenopia, the patient is unable, for more than a few minutes, to see small or near objects, as in reading, sewing, and the like; but is obliged, partly from the confusion and obscurity which seem to spread over the objects, partly from a feeling of fatigue in the eyes, to interrupt the exertion. With most patients, the attack begins by a sensation of constraint in the eyes, which they sometimes try to get quit of by repeated nictitation. Others complain of a feeling of tension or of weight in the eyes, with heat, lacrymation, and double vision. If the patient persists in using the eyes, notwithstanding the feeling of lassitude and the indistinctness of vision which supervene, the effort is attended with heaviness in the head, and pain in the eyeballs, orbits, temples, and forehead.

In the open air, the patient seldom makes any complaint, being able to discern large and distant objects, without confusion, indistinctness, or fatigue. When he commences to regard small or near objects, he also sees them, in general, with perfect distinctness, for a certain space of time, till the attack of asthenopia comes on, which it does, in different subjects, in an hour, half an hour, or even much sooner.

After the attack does occur, a few minutes' rest is, in general, sufficient to recruit the sight, so that the power of perceiving small objects returns, and the patient goes on again with his employment. When near objects fade away, as it were, from the view of the asthenopic sight, some patients feel it a sufficient relief to turn their attention to remote objects, which they continue to see perfectly; others find remote objects also to appear dim and confused, and require to shade their eyes till the attack wears off. The most complete relief is, in all cases, obtained by shutting the eyes. During the time that the eyes are shut, some asthenopic patients perceive ocular spectra of the objects to which they had been attending while their eyes were open, especially if the objects presented remarkable contrasts of light and dark colours.

As, in asthenopia, the effort necessary for reading, writing, sewing, and the like, cannot be sustained for the ordinary length of time, the patient is unable to pursue with comfort any sedentary occupation, requiring the close inspection of near objects. If he or she persists in attempting to do so, the attacks of weakness and weariness are apt to become more frequent and of longer duration; although we do meet with instances of patients fighting away with their occupations for many years, the asthenopia continuing nearly in the same degree since they first began to experience it. Tai-

* *Annales d'Oculistique*, Tome v. p. 250. Bruxelles, 1841.

lors and sempstresses affected with this disease sometimes manage to continue their employment during the first three or four working days in the week with comparative ease, but in the next two or three days, they find their sight becoming weaker and weaker, so that they can hold out with much difficulty, or are actually obliged to drop work. The repose of Sunday restores the power of vision, and enables them to resume their occupation on Monday. In some instances, the state of asthenopia is so very easily excited, that the patient is never able to learn any trade requiring the ordinary use of sight, or is never able to learn to read. These facts are sufficient to show the serious nature of asthenopia. It is an infirmity much more to be dreaded than many disorders of the eye, which to superficial observation present a far more formidable appearance.

In certain subjects, some particular employments only excite asthenopia, depending on the distance at which the objects must be viewed, and other circumstances; while other exercises of the sight, which might be supposed equally likely to produce fatigue, have no such effect. A young lady, for instance, was brought to me by her governess, who stated that the disease showed itself only when her pupil tried to make out her music at the piano-forte. A girl applied to me, who had been employed for some years in winding yarn in a warehouse, and had done this without difficulty, but who could not, from asthenopia, make a livelihood by sewing white-seam.

The symptoms are, in general, altogether subjective. On examination, the membranes of the eye are found to be healthy, the transparent media clear, the pupils lively, and neither immoderately dilated nor contracted. Even at the moment when exertion of the eyes on minute objects has produced the wonted attack, the pupils do not present more than a medium degree of dilatation. In some instances, the eyes appear dull, languid, and inanimate, having lost the expression of force and intelligence, and acquired one of feebleness and indecision; but, in general, they present no marked sign of disease.

Asthenopia is, in ordinary cases, unattended by any increased sensibility, intolerance of light, or pain in the organs of vision, unless the patient forces his eyes to continued exertion even after the attack comes on. Then, indeed, pain is produced in the eyes and head. Some patients, however, complain of pain in the upper part of the eye-ball, as if it had received a blow, even when their eyes are at rest. Pain in the middle of the forehead, is also a symptom which many mention, as almost constantly present.

The tongue, in patients affected with asthenopia, is generally clean; sometimes it is swollen, and marked round the edges by the teeth. The appetite is tolerably good; and the bowels regu-

lar. This disease rarely appears to be connected with any disordered state of the digestive organs.

The habit of body of asthenopic patients is generally delicate. Paleness of the face and coldness of the extremities indicate the feebleness of their circulation. We rarely, if ever, meet with this disease in robust or plethoric subjects. On the contrary, those who suffer from asthenopia are, with few exceptions, wan and ill-fed; frequently thin girls, whose bodies and minds are depressed by a sedentary life, want of air and exercise, and other causes.

Asthenopia is rarely observed to commence in those who have reached the middle period of life; but almost exclusively takes its origin in childhood or youth. Commencing at a very early age, it may continue through the whole of life.

Females are as frequently the subjects of this disease as males; but it seldom, if ever, seems connected with disordered menstruation.

§. 4. *Diagnosis*.—The vulgar are apt to include every sort of disease of the eye under the term *weak-sight*; such as, the ophthalmiae, external and internal, intolerance of light, nebulous cornea incipient or partial opacities of the crystalline body, ophthalmia tarsi, affections of the lacrymal passages, myopia, presbyopia, muscae volitantes, and amblyopia, or incomplete amaurosis. Even the interruption given to vision by an inverted eyelash will constitute *weak-sight* with them.

Nor are medical authors free from the error of jumbling a variety of diseases under the head of *weakness of sight*; for instance, the indistinctness of vision which occurs at the commencement or in the course of some of the ophthalmiae. Jüngken's *hebetudo visus syphilitica* is an example of this, and cannot be admitted as an asthenopia.

The diseases with which asthenopia is most apt to be confounded are photophobia, incipient myopia, presbyopia, night-blindness, and amblyopia or incomplete amaurosis.

1. *Photophobia*.—Mr Stevenson has written a work, entitled "Weakness of Sight, or Morbid Sensibility of the Eye," in which the reader might perhaps expect asthenopia to be described;—instead of which he meets with an account of intolerance of light and lacrymation, a state of the organs of vision, which, though distinguished by Mr Stevenson from amblyopia, he confounds with the disease now under our consideration. In asthenopia, there is, in general, no extraordinary flow of tears, nor does the patient suffer from exposing the eyes even to bright light.

Beer* himself is not free from the error of confounding asthenopia with increased sensibility of the retina.

The photophobia attending inflammation of the conjunctiva, caused by the heat which accompanies strong artificial light, and

* Op. cit. Vol. ii. pp. 34, 35.

especially gas-light, is sometimes confounded with asthenopia. The inflammation in question is marked by a hot and irritable state of the eyes, the eyelids feel dry and stiff, and at length become painful and itchy, obliging the patient to be continually rubbing them. These symptoms arise from a suppression of the natural secretion of the conjunctiva; but the disease remaining unchecked by rest and other means, the conjunctiva becomes much more inflamed and begins to secrete puriform mucus. The patient, as in asthenopia, is forced to abandon the occupations which he had been pursuing by artificial light; but the slightest attention will enable the practitioner to distinguish the photophobia of this, or of any other, ophthalmia, from asthenopia.

2. *Myopia*.—It sometimes happens, that young persons, about the age of puberty, after severely trying their eyes upon minute objects, as in painting, embroidering, and the like, suddenly become short-sighted. They and their friends are alarmed at their being no longer able to see objects on the opposite side of the street, which a few days before were distinguished with ease. The effort necessary for seeing small objects is attended with pain; and instead of fifteen or twenty inches, at which the patient used to read, the book must be brought as close to the eyes as six or eight inches. Sudden myopia is most apt to occur in boys, sent to learn such trades as watch-making or engraving, or in young ladies at school, occupied with music, painting, embroidery, and other pursuits, requiring continued and keen employment of the sight. I have known myopia, occurring suddenly in such subjects, treated as amaurosis, but it is more apt to be confounded with asthenopia. The application of a concave glass shows at once the true nature of the case.

3. *Presbyopia*.—Those who have become long-sighted can at no time see near objects distinctly, unless through convex glasses. In asthenopia, the patient sees near objects distinctly for a certain space of time, after which they appear confused and obscure. It is not wonderful, that these two conditions should sometimes be confounded. This is especially apt to happen when presbyopia manifests itself in children, an instance of which I have seen since I began to put these remarks upon paper. The child, a boy of seven years of age, after an attack of influenza, became unable to read, except with convex glasses. The relief, afforded to the asthenopic patient, by the employment of convex glasses, is a circumstance exceedingly apt to cause the two diseases to be mistaken for one another. The diagnosis will be plain, when it is observed, that in asthenopia a short period of rest restores the power of distinguishing near objects, while in presbyopia, rest has no effect.

4. *Night-blindness*.—The distinctly periodical attacks of night-blindness, and the fact that the imperfect state of vision is not re-

lieved by repose, but only by the return of daylight, should sufficiently distinguish it from *asthenopia*.

5. *Amblyopia* or *incomplete amaurosis*.—It is a maxim in classification, that magnitude affords no specific distinction.* Were *asthenopia* merely a less degree of *amblyopia*, they could not with correctness be regarded as distinct diseases. The difference between *amblyopia* and *amaurosis* being merely in degree, they constitute one species; but between *amblyopia* or *incomplete amaurosis* and *asthenopia*, there is reason to believe that a specific difference exists, and that they involve different parts of the organ of vision.

In *amblyopia*, there is constantly present an indistinctness of sight, extending to all objects, large and small; in *asthenopia*, vision becomes obscure, only after being exerted upon near objects. In *amblyopia*, the patient sees best, after fixing his eyes, or *steady-ing* them, as he often terms it, for some time on the object; in *asthenopia*, it is then only that he begins to see ill.

Asthenopia has generally been treated as incipient *amaurosis*; but there seems no necessary connection between the two diseases.

§. 5. *Complications*.—Pure *asthenopia* is not uncommon. It then appears to be the effect, neither of any previous disease of the eyes, nor of any constitutional ailment implicating these organs. On the other hand, it is by no means uncommon to find *asthenopia* complicated, either with some other disease of the eye, or with some general disorder of the nervous, or of the circulating, system.

For example, we find *asthenopia* affecting eyes which still show traces of some one or other of the *ophthalmiæ*, and especially specks of the cornea. In one case, I found inflammation of the anterior crystalline capsule combined with *asthenopia*. Some of the subjects of this disease are myopic; others prematurely presbyopic. The weakness is in many cases most troublesome during the use of artificial light, and even approaches to night-blindness in the suddenness of its attacks, and the degree of imperfect vision which attends it. The disease is often accompanied by *muscæ volitantes*; sometimes by oscillation of the eyes; and not unfrequently by strabismus.

Asthenopia generally affects the two eyes pretty equally. If only one eye is affected, and the other good, the disease is apt to be overlooked. One eye being completely amaurotic, or disorganized, *asthenopia* not unfrequently affects the other. It sometimes happens, that one eye is incompletely amaurotic, and the other only *asthenopic*. In general, an incompletely amaurotic eye is free from the characteristic symptom of *asthenopia*; but, in some instances, we find *amblyopia* or *incomplete amaurosis* accompanied

* Linnæi *Philosophia Botanica*, §. 260. p. 206. Vienna, 1755.

by asthenopia. When this is the case, the view of all objects is, at all times, more or less obscure, while an attempt to read or write is speedily followed by a new degree of indistinctness, and an incapability of continuing the exertion, which incapability a little rest removes. The patient who is so affected is likely to complain of photopsia and *muscæ volitantes*; and his pupils will be limited and sluggish in their movements.

The consistence of an asthenopic eye is, in general, natural; but, in some instances, it is too firm, while, in others, the cornea and sclerotica are too flexible, symptoms denoting in the one case a redundancy, and in the other a deficiency of the vitreous fluid.

Asthenopia is often attended by general debility, and by considerable depression of the powers of the mind as well as of those of the body. In such cases, the pulse is quick, small, and compressible; and the patient is inanimate, and affected with chilliness. In some, the symptoms denote an approach to anæmia. In many, the scrofulous diathesis is manifest.

§. 6. *Remote Causes*.—Having satisfied ourselves by an examination of the symptoms, that any case coming before us, is one of asthenopia, and having ascertained the extent to which the disease has proceeded, the period of life when it commenced, and the general state of health by which it is attended, our next inquiry should be into its remote cause. To trace the disease correctly to this is of the greatest importance, as it is the remote cause which affords some of the chief therapeutical indications.

1. In many instances, asthenopia appears to be an idiopathic disease, resulting entirely from over-exertion of the sight. On inquiring into the history of the case, we find, that previously to exercising the eyes upon minute objects, without proper intermissions, these organs were strong and healthy, having either never suffered from any of the ophthalmiæ, or if so, having perfectly recovered, and that, as the patient has laboured under no chronic affection of the general health, there is no reason to regard the weakness of sight as a symptom of any other disorder of the nervous, or of the circulating, system.

Young lads engaged as clerks or book-keepers, or bound apprentices as tailors, watchmakers, pattern-drawers, compositors, or engravers, and young women, employed as dress-makers, or sempstresses, afford frequent examples of asthenopia from pure abuse of the eyes. Students, and those engaged in literary pursuits, who spend their days, and great part of their nights, in reading and writing, often reduce their sight to a state in which it is incapable of supporting the smallest application. Individuals whose circumstances relieve them of any necessity to over-work their eyes, who are sober and chaste in their mode of life, and scrupulous observers of the general rules of health, not unfrequently sacrifice their sight to their particular tastes in literature, or in the fine arts.

Various incidental circumstances seem to aid the influence of over-use of the eyes in producing the impotency constituting the characteristic symptom of the disease; such as working by artificial light, want of the due quantity of sleep, and excessive occupation of the brain.

For various reasons, it is always more injurious to the eyes to over-work them in the inspection of minute objects, by artificial than by day light. This is a topic which has been carefully handled by the late Dr James Hunter of Edinburgh, whose work * may be consulted with advantage. He ascribes the injurious effects of artificial light chiefly to the four following causes, viz. 1. The bad colour and defective chromatic constitution of the rays of artificial light; 2. Their greater heating power in proportion to their illuminating effect; 3. The formation and disengagement of carbonic acid gas during combustion; 4. The unsteadiness, and the generally disadvantageous position and direction of the light. Though Dr Hunter dwells chiefly on the injury sustained by the surface of the eye, and by the retina, it cannot be a matter of doubt that the whole organ suffers from these causes.

From the excess of red and yellow rays in artificial light, coloured objects seen by it appear very different from what they do in day-light, which contains a larger proportion of blue rays. Not merely does the retina become less sensible to those rays which are in excess in artificial light, but from its great pre-eminence of defining power, objects appear much less distinct in it than when viewed by day-light, and hence a greater straining of the eyes is necessary in order to discern them. Thus, in reading or writing by day-light, as Dr Hunter observes, the black ink is strongly contrasted by the pure white paper; but by artificial light, as the paper then assumes an orange or yellow hue, the contrast is not so marked, and for distinct vision it becomes necessary to increase the quantity of light. In sewing blue fabrics by artificial light, the eyes must be very much exerted, because, in consequence of the fewness of blue rays, which are the only ones reflected from blue surfaces, the cloth appears almost black, except the light be very intense.

The rays of artificial light are generally allowed to fall directly on the object looked at, from whence they are reflected to the eye, along with nearly all their accompanying heat. The heat acts injuriously on the surface of the eye; it irritates and indirectly weakens the whole optic apparatus.

It is the absorption of carbonic acid gas by the lungs and skin, that causes the headach so generally and often so severely felt, after remaining for some time in crowded and brilliantly illuminat-

* On the Influence of Artificial Light in causing Impaired Vision. Edinburgh, 1840.

ed assemblies at night, as in churches, ball-rooms, and theatres. It does not act directly on the eye, but on the brain and nerves, the sensibility of which it weakens and ultimately would destroy.

Sun-light is remarkable for the equability with which it flows, so that in looking closely at an object illuminated by it, not the slightest wavering or flickering is perceived. But all artificial light is more or less unsteady, from the impossibility of perfectly regulating the supply of air and of inflammable material. This unsteadiness is highly trying to the eyes, particularly if it takes place to such an extent as happens when a gas-pipe contains some drops of water. Even in more common cases, a much slighter degree of unsteadiness always proves hurtful, by rendering necessary the employment of a greater quantity of light than would be required if the flame were of uniform intensity.

The generally improper position of the sources of artificial light, allowing a great quantity of extraneous light to pass into the eye, is productive of bad effects. When the eye is protected from the direct rays of artificial light, a small and near object can be seen with less light, and consequently with less excitement of the organ of vision. Yet how generally are artificial lights placed directly in front of the eyes of those engaged in fine work, and almost close to them !

The last five paragraphs containⁿ a summary of Dr Hunter's views regarding the disadvantages of artificial light. I have no doubt that these disadvantages operate powerfully in the production of asthenopia.

Want of sleep is sometimes the chief agent in producing the disease, as in night-work of all kinds, and especially in night-study. When not the chief agent, it in no small degree aggravates the operation of other causes. Sleep, by suspending the sentient and muscular actions of the organ of vision, repairs its vigour. This repose being denied, it is inevitable, that the powers of the eye must become debilitated. Even in the dark, want of sleep is detrimental to the sight ; much more so, if, amid the glare of artificial light, the eyes are forced on to exertion, in spite of the natural feelings of fatigue.

What may be called the hot-house education of modern times, is a fruitful source of asthenopia. Nothing is so hurtful to the sight as the combined straining of the eyes and mind, to which young people, and especially girls, are so often subjected about the period of puberty. A few days ago, a boy of twelve years of age, was sent to me by his parents, labouring under asthenopia. He told me, he attended school from 9 A. M. till 4 P. M., with only half an hour's intermission. The whole of the evening he spent in perusing the volumes of Chambers's Edinburgh Journal,—a work printed in small type. The disease had increased rapidly during the three weeks preceding my seeing him. With girls, there is

no end the live-long day to instruction of one kind or another,—reading, writing, the acquisition of different languages, arithmetic, drawing, needle-work, music, &c. Asthenopia appears frequently to arise from practising at the pianoforte, especially by artificial light. The notes are so small, and so like each other, that they cannot readily be distinguished, and are placed at a distance from the eyes, to which these organs with difficulty accommodate themselves. If the exhilarating recreation which the eyes, along with the rest of the body, and the mind, should enjoy in the open air is denied, and a young person, at the very period when the process of growth is going on rapidly, is pent up within artificial bounds, and condemned to sedentary occupations, is it to be wondered at that asthenopia should ensue, with paleness, feebleness, and emaciation? The natural development of the body is checked, a congested state of the brain is produced, the martyred being is crippled in body and mind, and but too often falls into incurable disease.

2. We frequently trace asthenopia to the influence of one or other of the ophthalmiæ, from which the patient had suffered at some previous period of life.

A child is sent to school at the age of 6 or 7; but it is found that he cannot be taught to read, and he is beaten for a month or two, because, though he sees quite well out of doors, and quite well when he first takes up his book, he cannot continue to read for more than a few minutes. On being brought for medical advice, the symptoms are found to be evidently those of asthenopia. On inquiry, it is stated by the parents, that the child suffered, when a few days old, from purulent ophthalmia, which, being at first neglected, was perhaps not overcome for a couple of months; or, that when two or three years old, he lay for weeks or months on his face, with sore eyes, unable to bear the least light. In either of these two cases, asthenopia is by no means an uncommon result, although it may not be discovered for several years after the existence of the ophthalmia.

The ophthalmia first referred to, or *ophthalmia neonatorum*, often extends to the internal parts of the eye. It is extremely likely to do so, if it is either neglected for a number of weeks, or from insufficient treatment is allowed to fall into a chronic state. In some subjects, it leaves an affection of the lens and capsule, and in others one of the choroid and retina. These sequelæ are often detected, only when the child is sent to school. In the former case, the eyes are found to be myopic; in the latter presbyopic. In either case, they are apt to be asthenopic; or they may suffer from asthenopia, without any deterioration of their refractive powers. Even when the eyes recover from the inflammation, without any opacity of the cornea, asthenopia is apt to be a sequela of *ophthalmia neonatorum*.

A fruitful source of asthenopia is to be found in the scrofulous inflammations of the eyes, and especially in the *phlyctenular ophthalmia*. It is well known, that in this disease, not only do serious changes take place in the textures of the eye, but that an obstinate reflex action of the *orbicularis palpebrarum* is excited by the incidence of the light upon the sentient nerves in an irritable state. The asthenopia which follows successive attacks of phlyctenular ophthalmia, may be ascribed partly to the changes produced by inflammation on the internal textures of the eye; partly, and perhaps chiefly, to the pressure on the eyes, produced by the patient, as he lies with his face upon his hands or upon the pillow, aided by the action of the eyelids, so long and violently closed by spasm. I have elsewhere mentioned* a case, in which, on the photophobia of scrofulous ophthalmia subsiding, the child, who was the subject of the disease, was discovered to be amaurotic,—a result which I incline to ascribe to the pressure so long exercised on the eyes. To the same cause may in some measure be attributed the impeded growth of the eyes, which attends a long-continued attack, as well as such changes in texture as leaves the patient in some instances amblyopic, and in others asthenopic. A girl was brought to me, with a small speck on each cornea, the results of scrofulous ophthalmia in infancy. She was now 16 years of age, and affected with such a degree of asthenopia, that although she saw the smallest objects, she had never been able to learn to read. In cases of this sort, sometimes only one eye is affected with asthenopia; more frequently, both. The fear of so serious a consequence, makes it important to cure phlyctenular ophthalmia as speedily and perfectly as possible.

It is not the ophthalmia of childhood alone which give rise to asthenopia. This result may follow any of the inflammations of the eye.

If the patient relates that his weakness of sight was preceded by a frequent flashing of fire in his eyes, intolerance of light, and epiphora, with pain deep in the eyeballs, and extending from the eyes to the occiput, and that these symptoms were increased on stooping, or on straining in any way; or if his weakness of sight is still attended by these signs, along with *muscae volitantes*, and contracted pupils, there is reason to suspect that retinitis has existed, or still continues to exist in a chronic state.

If similar symptoms have been attended by a shifting of the pupil to one side, along with manifest thickening, or consequent thinning, of the sclerotica, the asthenopia is a result of sclerotic-choroiditis.

If the pupil be irregular, contracted, imperfectly moveable, and fringed with red vessels, or with projecting particles of pigment,

* Practical Treatise on the Diseases of the Eye, p. 453. London, 1835.

and the iris discoloured, and bolstered forward towards the cornea, iritis has been the cause.

If, on viewing the pupil through a lens of short focus, red vessels are descried, ramifying on the anterior crystalline capsule, the asthenopia has arisen from capsulitis.

If the patient is myopic, the cornea hazy, and the eye hydrophthalmic, corneitis has been the cause.

Such names as corneitis, iritis, &c., denote merely the chief seat or focus of certain ophthalmiæ, each of which affects more or less the whole textures of the eyeball, internal as well as external, and any one of which may lay the foundation of asthenopia. More frequently, no doubt, the ophthalmiæ are productive of amblyopia.

3. Injuries of the branches of the fifth nerve round the orbit appear, in many instances, to give rise to asthenopia. A large proportion of the patients who have come under my care with this disease, have presented cicatrices in the eyebrow or in the skin of the forehead, and many of them have been able to state, that till they had received the wound, leaving the scar, their sight had been strong. One lad, whom I saw on the 24th February 1843, stated, that, in about a year after he had received a deep cut at the inner extremity of his left eyebrow, his sight began to fail, and had now continued weak for seven or eight years. In other instances, the weakness of sight has not supervened till several years after the injury. It is well known, that incomplete amaurosis may often be traced to injuries of the integuments round the orbit, but I conceive asthenopia to be a still more frequent result.

The irritation or inflammation of the injured branch of the fifth nerve, in such cases, may be supposed to be propagated along the trunk of the nerve to the brain, and a reflex affection to be produced, implicating the third nerve, the optic nerve, or both.

4. Asthenopia is often traceable to affections of the encephalon.

The irritation of the brain in teething children, so frequently attended by convulsions, appears in many instances to be the cause of asthenopia.

A boy, of 13 years of age, was brought to me with asthenopia and presbyopia. When six years old he was very ill with measles, and lay insensible for some days. This was the origin of the affection of his eyes.

Another patient dated his weakness of sight to inflammation of the brain, when he was 19 years of age. Another traced it to nervousness, produced by a fright.

A gentleman, of 60 years of age, came under my care with slight hemiplegia; and, as this subsided, he found himself asthenopic. He saw the figures in some small prints which hung in his room, and all other distant objects, quite distinctly. He could read a line or so with the aid of his convex glasses, but no more.

The letters seemed to him as if they began to tremble, and get confused, so that he was obliged to desist.

Many asthenopic patients have consulted me, whose heads were hydrocephaliform, and some of these considerably above the average size.

I have known typhus fever, and malignant cholera, by implicating the brain, prove causes of asthenopia.

5. If asthenopia is attended by a heavy, sunk appearance of the eyes; if they present a dark circle round them, and feel hot to the touch; if the patient has a melancholy expression, with an air of absence and timidity; if he answers questions with hesitation; if he complains of pain and feebleness in the back and limbs, and inability to undergo ordinary bodily fatigue; these are strong grounds to suspect the cause of all his symptoms to be some abuse or disorder of the generative system, such as, excessive venery, masturbation, or spermatorrhœa. This suspicion will be strengthened, if we learn, that, within a short time, a remarkable change for the worse has taken place in his frame of body and mind; that he has become pusillanimous, deficient in memory, slow of intellect, incapable of bending his mind to any serious subject, taciturn, discontented, hypochondriacal, fond of solitude, misanthropical, and liable to indulge in thoughts of self-destruction.

If the patient be a male, we should inquire whether he is troubled with nocturnal pollutions. If these are frequent, there can be little doubt that the whole symptoms have originated in masturbation. The health may also suffer from diurnal spermatorrhœa, or the patient may be troubled with both nocturnal and diurnal emissions, and these may continue long after he has abandoned masturbation. The patient may have pollutions only when he goes to stool, a symptom generally attended by costiveness, and apt to affect those who sit too much, as tailors. Pollutions immediately after passing urine are also not uncommon; and in this case, there is pain at the neck of the bladder, the calls to make water are frequent, and the urine is thick, depositing a sediment like gruel, and speedily affording an offensive smell.

If the patient admits that he has been addicted to masturbation, it is proper to ascertain at what period of life he commenced it. Before puberty, although no semen is yet secreted, the nervous perturbation which is produced is exceedingly apt to affect the eyes with weakness, and often brings on epilepsy. At any period of life, besides the effects already enumerated, masturbation is often followed by loss of appetite, indigestion, headach, vertigo, *tinnitus aurium*, rigors, flushings, constant clamminess of the hands, want of sleep, signs of congestion or chronic inflammation of the brain, apoplectic symptoms, palpitation of the heart, and

emaciation, leading to a suspicion of phthisis. Palsy and insanity are not unfrequent consequences of masturbation.

I have often ascertained, that asthenopia, in young men, is a result of excessive venereal indulgence, but more frequently still, of masturbation, or of involuntary emissions. I have no doubt, that masturbation is a frequent cause of the same complaint in females.*

Dr Pauli relates† the case of two sisters, the one 28 and the other 23 years old, both of whom, from masturbation, brought on asthenopia, along with great debility, and melancholy. Among other symptoms, he mentions a habit of constantly biting their nails, a trick to which masturbators are particularly attached, and a repugnance to marriage, which is also characteristic of the class. Females, affected with asthenopia, often labour under leucorrhœa, and this, as well as barrenness, is in many cases a consequence of abuse of the generative function.

I shall not insist on the other causes to which asthenopia appears to owe its origin. I may merely mention the following as deserving attention;—congenital imperfection, a sedentary life, want of exercise, a bent position of the body during work, dyspepsia, constipation, and the use of alcohol, opium, and tobacco,—poisons which tend to blunt all our sensitive and motive powers.‡

§.7. *Proximate cause*.—Pathological anatomy has not yet been had recourse to, as a means of discovering the seat and nature of the morbid changes upon which asthenopia immediately depends. Although it is impossible to believe, that the vital powers of sensibility, irritability, or contractility can labour under disease, without some morbid change in the solid structures by which these powers are exercised or controlled, or in the quantity or quality of the fluids with which these solid structures are in contact, yet it is very possible, that in such a disease as asthenopia, the morbid changes, by affecting extremely minute parts, might not be easily, or perhaps be not at all, appreciable by the human senses. Were it so, it would be but begging the question, to call the disease a *dynamic* one, or to ascribe it to a morbid *action* only of the parts concerned; and equally absurd as it would be to say, that such or such an effect could arise without a cause.

* "Les femmes sont également enclines à ces mauvaises habitudes." Berton, *Traité pratique des Maladies des Enfants*, p. 800. Paris, 1842.

† "Cette malheureuse passion amène exactement les mêmes résultats dans l'autre sexe à tous les âges." Lallemand, *Des Pertes Seminales Involontaires*, Tome iii. p. 207. Paris, 1842.

‡ Ammon's *Monatsschrift für Medicin*, Vol. i. p. 592. Leipzig, 1838.

§ As far as my experience goes, the operation for squinting has little effect either in improving or impairing vision. Mr James J. Adams relates (*Medical Gazette*, Vol. xxxi. p. 398, London, 1842.) a case, in which he thinks asthenopia arose from the operation, and in which it was cured by new divisions of the recti.

As pathological anatomy has thrown no light on the seat or nature of asthenopia, we are left altogether to conjecture, respecting its proximate cause.

1. Mr Tyrrell regards asthenopia, which he designates by the name of *impaired vision*, as depending on temporary congestion of the choroid. The grounds on which he has adopted this view of the subject, appear to be, *first*, that there is a similarity between asthenopia and the confusion of sight which arises from stooping; *secondly*, that asthenopia is frequently preceded or accompanied by *muscæ volitantes*; *thirdly*, that it is attended by a sense of fulness in the eyeball, and a weight or uneasiness about the forehead; and *fourthly*, that, if neglected, it ends in choroiditis.

That the fatigue which arises in the healthy eye, when overwrought, is attended by a congested state of the retina and choroid, and that rest relieves that fatigue, by allowing the circulation of blood through the arteries and veins of these structures to resume a state of equilibrium, does not appear an unlikely conjecture. The confusion of sight which attends asthenopia may, it is probable, be accompanied by a similar congestion, and the rest by which asthenopia is for the time removed, may allow this congestion to subside. But the grounds on which Mr Tyrrell has fixed on the choroid as the special seat of congestion in this disease, are in some respects inconclusive, and in others contrary to experience.

The similarity between the attack of asthenopia and the confusion of sight caused by stooping, is not particularly striking. The latter has its seat probably in the brain; the former in the eyes. The latter involves the vision of distant, as much as that of near objects; the former leaves in general the vision of distant objects unimpeded.

That asthenopia is occasionally complicated by *muscæ volitantes* is undeniable; but is not a varicose state of the blood-vessels of the retina, a much more probable cause of *muscæ volitantes*, than congestion of the choroid? Is not congestion of the choroid more likely to give rise to photopsia, agreeably to the well-known effect of pressure on the convex surface of the retina?

A sense of fulness in the eyeball, and a weight or uneasiness about the forehead, are symptoms much too vague to prove the choroidal seat of asthenopia.

If neglected, Mr Tyrrell states, that the disease which he terms *impaired vision* ends in choroiditis. Of the many cases which I have watched for years, I have seen none which terminated in this way. Nor is choroiditis, as far as my observation goes, preceded by those temporary attacks of confused vision, relieved by rest, which constitute the specific character of asthenopia.

Were asthenopia the effect of congestion merely, either of the

choroid or of the retina, it is probable, that it would be easily cured by depletion, abstinence, and similar remedies ; but this is not the case. Such remedies cure choroiditis or congestive amaurosis, but have, in general, no effect in relieving asthenopia, which, therefore, as well as for other reasons, cannot be regarded as a tendency to choroiditis, or as an incipient amaurosis.

2. Scarpa, Beer, Lawrence, and others consider asthenopia as an affection of the retina. According to Scarpa, it arises from "weariness of the nerves, particularly of those which constitute the immediate organ of vision." Beer speaks of it as "depending on a failure of the retina," as arising in some instances from "a change in its vital power, or even in its structure," and in others as the effect of "a direct weakness of the retina." Lawrence, conscious of the want of precise meaning in such explanations as those of Scarpa and Beer, observes, that "the mode in which the retina suffers has not yet been ascertained."

That there is no considerable change of structure in the retina, is manifest from the fact, that the power of vision is not permanently impaired in this disease. The minutest objects are seen, for a time, as clearly as in the natural state of the eye.

To say that it consists in fatigue, or weariness, of the retina, is to say nothing, unless we were prepared to explain the physiology of fatigue—the anatomical change which a sentient nerve undergoes, which has been over-excited. That a nerve, in this condition, becomes incapable of being accurately impressed, or of accurately conveying the impressions it receives to the *sensorium commune*, it is well known ; but how this impotency arises, whether the circulation of the blood through the nervous structure becomes impeded, or the imponderable agent of nervous power exhausted, or the vibrations of the nervous papillæ cease, we cannot tell, being equally ignorant of the nature of nervous action in health, and of its failure under fatigue or from disease.

That the sole seat of asthenopia is the retina, is improbable ; that it is in part the seat of it scarcely can be doubted. In reading, writing, and the similar occupations during which asthenopia is apt to occur, the objects to be viewed are small, the eyes are intensely employed, the pupils converged towards the same point, and the images of objects received on the very vertices of the retina. It follows, that the thin portion, within the *limbus luteus*, is the part of the retina affected in asthenopia. In viewing distant objects, a larger field of the retina is employed, it is impressed by a greater variety of forms, and relieved rather than exhausted by the diversity of colours and the contrasts of light and shade. In such exercise of sight, an attack of asthenopia never happens.

I shall immediately explain, that asthenopia is, in a great measure, a disease of the apparatus by which the eye is adjusted to

the vision of near objects ; that it is not wholly an affection of those parts, but implicates the retina, is evident from the fact, that when the eye is fatigued in asthenopia, the patient cannot see distinctly or with comfort through a small aperture, and that cases of this disease occur in combination either with myopia, or with presbyopia. Were asthenopia entirely a disease of the apparatus of accommodation, looking through a small aperture, by rendering the use of the accommodating power unnecessary for the time,* would make vision distinct. In myopia, the formation of the refractive parts of the eye renders it permanently fitted to see near objects, and yet those who are short-sighted are liable to asthenopia. Patients labouring under the combination of presbyopia and asthenopia, by the use of convex glasses, render the action of the adjusting organs unnecessary, yet are not exempt, while using their glasses, from the attack of weak-sightedness.

3. The eye, in its normal condition, possesses a power of adjustment, by which it is enabled to bring to focal points upon the retina, the diverging rays proceeding from near objects as well as the parallel rays proceeding from objects which are remote. Wherever the motion resides, by which the refraction performed by the eye is increased, so as to shorten its focal distance, and adapt it to the vision of near objects, it is plain, that the asthenopic eye is not entirely deprived of the power of performing that motion ; for on first looking at near objects, the patient sees them perfectly, and continues to do so till the attack comes on. He then loses sight of near objects, and becomes presbyopic. His vision of distant objects continues distinct, but his eye refuses to sustain the effort, necessary for bringing the rays of light, arising from objects within a certain distance, to focal points on the retina. The organ or organs of adjustment, then, are affected in this disease ; and are probably the chief seat of the complaint.

A hypothesis which I have formed † on the subject of adjustment is, that the iris and the ciliary processes are antagonists ; so that, when the pupil contracts, as it always does on our directing our attention to near objects, the ciliary circle expands ; and when we look at distant objects the pupil expands, and the ciliary circle contracts around the lens. On the ciliary circle expanding, the crystalline will be allowed to advance towards the pupil, so as to assist in shortening the focal length of the eye ; on its contracting, the crystalline will again retire towards the retina. This alternate motion of the crystalline probably does not exceed one-twentieth of an inch in extent. The expansion and contraction of the ciliary circle, coinciding with a contraction and expansion of the

* Porterfield's Treatise on the Eye, Vol. i. p. 395. Edinburgh, 1759.

† London Medical Gazette, Vol. xiii. p. 631. London, 1834. Physiology of Vision, p. 185. London, 1841.

pupil, is a fact which I have ascertained by observing the state of the parts in the dead body. These changes of the iris and ciliary processes, attended by a change of place of the crystalline, may be accompanied by a change of figure of the crystalline, its axis being elongated when it advances in the eye, and shortened as it retires. Nor is it at all improbable that the contraction of the straight and oblique muscles, while it tends both to elongate the axis of the eye, and shorten the radius of curvature of the cornea, aids the advance of the crystalline.

Without entering on the question, whether the iris and ciliary processes are muscular, I may observe, that the motions of these parts are undoubtedly under the influence of the third nerve, or *motor oculi*, and if deprived, by any cause, of their usual nervous stimulus, their motions must be impeded, and the function of adjustment be imperfectly performed. This is the case in asthenopia. On exposing an asthenopic eye to various degrees of light, the motions of its pupil may be as vivid and extensive as those of a healthy eye. On first being turned towards a near object, the pupil may also be observed to contract, but if we watch the eye, applied seriously to the continued vision of a near object, as in reading, the pupil will be seen, in general, to assume a medium state of dilatation, and not to maintain its state of contraction, as would the pupil of a sound eye under the same circumstances. We cannot doubt that the ciliary circle assumes also a medium degree of expansion,—a state of parts sufficient of itself to produce almost the whole symptoms of the disease. The effort necessary for adjustment cannot be sustained, the focal length of the eye can no longer be shortened as it should be, the letters of the book necessarily fade from before the sight, and the feeling of fatigue creeps over the eye. It is probable that the cause of incapacity resides, not in the ciliary circle nor in the ciliary nerves merely, but in the third nerve, and other muscular nerves of the eye, generally. The contraction of the recti and obliqui, then, so necessary for keeping the eye in a state of libration, for directing it along the lines of the printed page, for converging the two eyes to the same point, and perhaps for compressing the globe of the eye, so as to maintain an increased distance between the retina and the cornea, must, in this case, gradually give way under the effort demanded, so that these muscles fall into a state of minimum contraction. The consequence is, that at length the upper eye-lid drops, and the patient is obliged to indulge in that cessation of visual exertion which experience has taught him will regenerate his exhausted powers of sight, and enable him by-and-bye to resume his labour.

That asthenopia, however, is not solely an affection of the adjusting organs is shown by the facts already mentioned ; namely,

that looking through a small aperture does not render vision distinct under the attack, that this disease is frequently accompanied by myopia, and that presbyopic persons occasionally suffer from it, even when using convex glasses.

4. Adams, Bonnet, Pétrequin, and others, regard the morbid state of the sensitive system of the eye, constituting *asthenopia*, as the result of a disordered state of its motive system; or, in humbler phrase, they attribute *asthenopia* to a morbid activity of the muscles of the eyeball, and not at all to a want of energy of any part of the optic apparatus.

Mr Adams calls the disease *muscular amaurosis*, and states his belief that it “depends on the bending or partial folding, and compression of the optic nerves, caused by the shortening and thickening of the recti muscles during a state of morbid contraction, which farther may be attributed to an affection of the third and sixth nerves, probably at or near to their origins.”

That *amaurosis* might arise from an inordinate action of the muscles of the eyeball, or of their nerves, affecting the optic nerve, is an old notion. Speaking of the *amaurosis* which results from injuries of the frontal nerve, Sir Charles Bell * remarks, that “Morgagni supposes this to be occasioned by the spasmodic action of the recti muscles pressing the globe of the eye down against the optic nerve.” I am not aware of any passage in the writings of Morgagni, in which he expresses so decided an opinion on the matter, as is here ascribed to him. In his eighteenth Anatomical Epistle, † he gives an account of the opinions held by Willis, Valsalva, and Vieussens, regarding the relations of the optic nerve to the other nerves entering the orbit, and to the muscles of the eyeball. Willis thought that, in the exercise of its function, the optic nerve required to be occasionally dilated and constricted, and supposed it for this purpose to be surrounded by the branches of the *motor oculi*. Valsalva was of opinion, that the origins of the muscles around the optic nerve formed an annular moderator, better calculated to produce the effect required than the branches of nerves. Morgagni conceived that the optic nerve was more likely to be affected in its length than in its thickness by the actions of the recti and obliqui, the former by their contraction tending to increase its curvature, and the latter to diminish it. Vieussens supposed the optic nerve, during convulsions, to be constricted by the other nerves, a notion of which Morgagni approves, both in his eighteenth Anatomical Epistle, and in his work, *De Sedibus et Causis Morborum*, Lib. i. Epist. xiii. 5. I suspect that the idea of the globe of the eye being

* *Anatomy of the Human Body*, Vol. ii. p. 459. London, 1811.

† *Epistolæ Anatomicae ad Scripta pertinentes Valsalvæ*, Vol. ii. p. 306. Vene-
tiæ, 1740.

pressed down against the optic nerve, so as to produce blindness, which is exactly the hypothesis of Mr Adams, was attributed by Sir Charles Bell to Morgagni, without a sufficiently careful examination of the works of this author.

Dr Bonnet observes, that asthenopia manifests itself when the muscles, accommodating the eye to the vision of near objects, exercise upon the eye a compression carried to such a degree as to be painful. Dr Pétrequin also mentions, that the feeling of the patient is as if the eye were squeezed between the fingers. I have never heard any patient express himself in terms such as could lead me to suppose that even an approach to so painful a sensation was ever felt in asthenopia.

Dr Pétrequin calls our attention to the manner in which the eyeball is surrounded by the four recti and two obliqui, forming, as it were, a muscular coat to the organ, the tension of which coat he supposes capable of reacting on the visual functions, and *vice versa*. It would appear that Dr Pétrequin believes the muscles of the eye to be in a state of inordinate contraction, and even spasm, during an attack of asthenopia. He tells us, that he has often employed as a therapeutic agent in this disease, "the application of cold, which exercises, as every one knows, a sedative action on the muscular system, calming spasm, moderating contraction, and sometimes suddenly removing fatigue." By means of a compress wrung out of a cold fluid, or by means of a douche administered with a syphon, he says the symptoms have sometimes disappeared in a few minutes, "by causing the tension of the muscles to cease,"—a notion which does not seem to harmonize with the names of lassitude and fatigue which he bestows upon the disease.

Convex glasses relieve asthenopia, by rendering unnecessary the effort which should adjust the eyes to the vision of near objects. According to Dr Pétrequin, they permit the spasm of the muscles to cease, and the muscles to fall into a state of repose. A more likely explanation would be, that the muscles are no longer capable of contracting to the necessary extent, but have already fallen into a state of fatigue and undue relaxation. But the fact is, the external muscles of the eyeball betray no decided signs either of the one state or the other. When the attack of asthenopia comes on, the eyes continue to change their directions naturally in the orbits, according to the situation of the objects regarded, being neither jerked about by spasmodic twitchings, fixed by anything like cramp, nor left motionless from muscular inability. In this disease there is sometimes a languid expression of the eyes, but assuredly there is no approach to paralysis of the external muscles, and no symptom of anything like exaggerated or uncontrolled action;—nothing like the painful compression of the eyeball spoken

of by Bonnet and Petrequin; nothing to vindicate the notion of Adams, that the muscles are in such a state of morbid contraction as to bend, fold, and compress the optic nerve.

If the external muscles of the eyeball are in part the seat of the morbid condition, upon which asthenopia depends, it is probable that they contribute to this disorder by their inability to continue the aid which they afford in their healthy state, towards the adjustment of the eye to the vision of near objects. This adjustment evidently fails in the disease under consideration. Grant that the recti and obliqui are weak, or insufficiently stimulated by their nerves, they may be unable to compress the eyeball, so as to maintain the increased distance between the retina and the cornea, and carry the crystalline forward, as happens in a healthy eye directed to a near object. This seems a more probable and satisfactory conjecture than that which ascribes to the muscles a state of spasm, or one even of shortening and thickening from morbid contraction.

From these remarks on the proximate cause of asthenopia, the unbiassed reader will probably be led to conclude, that, although part of the phenomena admit of a plausible interpretation, the true nature of the affection remains a problem.

§.8. Prognosis.—The prognosis in asthenopia is on the whole unfavourable. If the disease has lasted for a number of years, and especially if it has originated in one of the ophthalmiæ, in an injury of one of the branches of the fifth nerve, or in some affection of the encephalon, it is rarely benefited by any sort of treatment.

In cases of recent date, much depends on the practitioner's detecting the remote cause, and on the patient's power of abstracting himself from its influence. This refers principally to the first and fifth of the remote causes already considered.

As far as my experience goes, asthenopia has very little tendency to wear itself out; but on this point, Mr Lawrence's testimony is worthy of attention. "This disease," says he, "is very obstinate and tedious, often lasting one, two, or more years, in spite of all our efforts, and appearing at last to cease spontaneously, rather than to yield to medical or surgical treatment."

If the disease is connected with plethora or local congestion, the prognosis is rather better; but if the patient is much debilitated, or of a scrofulous constitution, it is very unfavourable.

When a certain degree of asthenopia, more or less in different subjects, has continued for several years, so that it may be regarded as confirmed, it seldom increases, and rarely passes into amblyopia or amaurosis. The medical cautions which the patient receives contribute, no doubt, if attended to, to prevent his disease from gaining ground, or amaurosis from supervening. We may safely, then, answer in the negative to the question so often put to us, whether

the disease is likely to end in blindness. This is a point of great importance, as well as the diagnosis of asthenopia from incipient or incomplete amaurosis. A lady consulted me respecting her eyes, which were asthenopic. After I had explained to her the necessity of giving her eyes rest, and assured her that the disease, though probably incurable, would not end in loss of sight, she informed me that she had returned from India on account of the affection of her eyes; that her medical attendant there had pronounced it to be amaurosis; and that she was greatly alarmed lest she should become blind. Her mind was much relieved when I explained to her, that the disease was not amaurosis, and advised her to return to her family in India.

In many cases it is our duty to declare the disease incurable, and to explain to the patient and his friends, that all that can be done for it is, as much as possible, to save the sight. If the patient is a young lad, bound apprentice to a sedentary trade, and the disease, from its duration and its mode of origin, not likely to yield to treatment, we may advise him to turn shop-keeper, or to apply himself to country work; if a female occupied constantly in sewing, to engage in household affairs, or any other healthy active employment. Many a poor man have I told to give up his sedentary trade, and drive a horse and cart; while to those in better circumstances, and not far advanced in life, I have recommended emigration, telling them, that though they never could employ their eyes advantageously in reading and writing, they might see sufficiently to follow the pastoral pursuits of an Australian colonist.

Too often it happens that such advice cannot be followed, circumstances being such, that the patient must either continue the sedentary employment, which keeps up the disease, or starve. It is of the greatest importance for him, however, to moderate his application. Without this there is certainly no cure. All other remedies, without rest to the eyes, will be fruitless. Mr Tyrrell holds out more hope of a cure than my experience would vindicate me in expressing under almost any circumstances; but it is to be observed, that he depends chiefly on rest. "I have generally found," says he, "that such cases can be cured by carefully regulating the labour of the eyes, and steadily persevering in the other means."

§9. *Prevention*.—With regard to the prevention of asthenopia, it may be remarked in general, that the remote causes are carefully to be avoided. Those who, hitherto with impunity, have been exposed to one or other of the remote causes, should be particularly guarded in tempting the injurious influence of the rest. Thus children who have suffered from scrofulous ophthalmia, if put to a trade requiring earnest application of the sight, are very liable to become asthenopic. The following hints respecting the

exercise of the organs of vision, and the management of artificial light.

It is impossible to limit the time during which healthy eyes may be employed with safety upon minute objects, as there is a great variety in their power of bearing fatigue. The sight may be regarded as fatigued, whenever the person finds that he requires to bring the object nearer to his eyes than usual; whenever the object appears confused; whenever the eyeball or eyelids become red, or the eyes feel heavy, hot, or affected with a pricking sensation, or with a flow of tears. These symptoms occur more or less promptly in proportion to the strength of the organs of vision. The moment such symptoms are experienced, the person should rise from his work; relieve his eyes by turning them towards distant objects; bathe them with cold water, and, if circumstances permit, expose them to the external air.

Giving the eyes even a few minutes occasional rest is of great service in preventing them from becoming weak, especially when employed in such exhausting occupations as reading, writing, drawing, engraving, sewing, and the like. As important means of preserving the sight from weakness may be mentioned, changing the occupation from a fatiguing one to one requiring a less earnest use of the eyes; turning away from the light, if it is brilliant, or closing the eyes for a few minutes; changing the bent position of the body for the erect, and walking about for a little; avoiding everything tight about the body, as tight neckcloths, stays, and even shoes, so as to allow a free and equable circulation of the blood; regular exercise in the open air. The eyes should never be forced to continued exertion. The eyes of children especially should never be fatigued. They should never be allowed to read books printed in a very small type.

As it is impossible by any arrangement to render artificial light at all equal to day-light, he who would avoid weak-sightedness, should get through as much of his labour as he can between sunrise and sunset, and leave as little as possible to be done by artificial light. Day-light is comparatively steady and clear, and its defining power vastly greater than that of artificial light. All objects, therefore, are seen more distinctly, and consequently with less fatigue to the eyes, by day-light, while, at the same time, the debilitating heat, and the inhalation of the carbonic acid gas produced by combustion, are avoided.

In the work of Dr Hunter, already referred to, are numerous hints respecting the management of artificial light. Of the most important of these, the following is an abstract.

Of the various sorts of artificial light, that of gas made from parrot or cannel coal, should be preferred, as the purest and most equable. Gas light admits of being placed in any position, and

it is easy to increase or diminish its intensity. The argand is the best form of burner.

If the sight is much employed in fine work by gas-light, advantage should be taken during any temporary interruption, of the facility with which the intensity of the light may be instantly diminished, so as to afford rest to the eyes, and allow them to recover their tone. During the interval of repose, they may also, with advantage, be bathed with cold water, as a preventive of the bad effects of the heating power of artificial light.

The bad colour of artificial light should be corrected by the use of a conical opaque reflector, coloured blue inside, and placed above and around the light. By this means, the blue rays that are deficient in artificial light are added, and light approaching more to the white colour of daylight is obtained. Dr Hunter recommends also to allow the light to pass through some transparent medium of a pale blue colour, such as stained glass or a coloured fluid, so as to absorb the red and yellow rays which are in excess. But as this cannot be effected without a considerable diminution in the intensity of the light, the former plan is preferable.

To avoid the bad effects arising from the great heating power of artificial light, the ventilation of the apartment should be constantly attended to, and care should be taken to obtain the highest illuminating power with the lowest consumption of inflammable matter. If the room is warmed by hot air, or by a stove, a flat dish, containing water, should be set in some convenient situation, so that a proper degree of moisture in the air may be maintained by the evaporation of the water. If the light is nearly on a level with the eyes, and shaded by a metallic reflector, the outside of the reflector should be covered with some bad conductor of heat, such as wood or leather.

If a number of individuals be congregated in a small apartment, where artificial light is much employed, as in the work-shops of many classes of artisans, the carbonic acid gas and heated air, generated by respiration and combustion, should be carried off by ventilators in the roof, communicating directly with the open air, or leading into a chimney in which there is a constant draught. A metal tube, with a funnel-shaped extremity placed over the lights, and communicating with the open air, or with the chimney, is of great advantage, by removing the carbonic acid gas as soon as it is formed, and allowing the apartment to remain cool.

In public places, and in the sitting rooms of private houses, artificial light should be diffused equally by ground glass-shades. In libraries, counting-rooms, and workshops, the light requires to be concentrated on the objects of inspection, by opaque, conical shades or reflectors, which protect the eyes from the source of the light and from its extraneous rays, as well as, if painted blue internal-

ly, correct the bad chromatic composition of artificial light. Those who work much over strong fires will find it useful to wear a bonnet shade, made of pasteboard, blackened on the inside, and covered with tin-foil on the outside, so as to reflect the heat.

§ 10. *Treatment*.—When the nature of a disease is understood, the cure is reduced to a few simple means; but when the proximate cause of any complaint is the subject of conjecture only, the treatment is necessarily uncertain and multifarious. This, then, is the case with asthenopia.

1. *Avoidance of the remote causes*.—The means which are proper to be followed for the prevention, ought still more carefully to be employed for the cure, of asthenopia. One of the most important of those means is avoidance of the remote cause, whatever it may be, which has produced the disease. Before prescribing any thing, then, the practitioner will make it his business to investigate the history of the case before him, and will afterwards advise according to the remote cause which has been in operation.

As a general principle, the patient must endeavour to desist from everything which weakens the nervous system, or exhausts the organ of vision. If he cannot altogether abandon the employing of his eyes upon minute objects, he must at least allow them the necessary periods of relaxation, and, if possible, choose for his amusements, such as may lead him to the extended prospects and refreshing verdure of the country. If confinement within doors be the cause, this should be changed for some active employment. Bad practices must be abandoned, and every particular be studied which is likely to fortify the constitution. Perpetual exercise in the open fields should be substituted for the monotonous restrictions of a town life, and a hard bed and early rising for the enervating contrivances of luxury and laziness.

2. *Rest of the eyes*.—The patient ought never to work too long without giving his eyes rest, and ought to avoid as much as possible the fixing of them on very minute objects.

“Supposing a patient could work for an hour,” says Mr Tyrrell, “but not longer, without producing disturbance of vision, he should then be directed to work only for half an hour, at a time; and to allow intervals of rest, of a quarter of an hour each: he can thus work for two-thirds of his usual time, while his cure proceeds.” “The period, allowed for employment, should be short of that in which application produces the disturbance of vision; and the time devoted for resting the eyes, should never be less than a quarter of an hour.

“Supposing that the impaired vision,” continues the same author, “occur within half an hour, or less, after the eyes have been employed at work, it is best for the patient to refrain from work altogether, for a week or two, until the affection be mitigated.”

Although the abstaining from such employments as require the

eyes to be exercised for any considerable length of time on small objects, is one of the most evident indications in *asthenopia*, and without which any other means of cure are likely to prove fruitless, yet I fear that any hopes which might be formed of curing the disease by rest alone, would prove delusive, unless in incipient cases, arising solely from over-straining of the sight.

We must beware, too, of deceiving ourselves regarding the effects of other remedies, used during the observance of rest. The good effects which they may seem to produce, will often be nothing else than the restoration which always takes place during repose. Whether this is the case or not, will readily be ascertained on the very first application of the eyes to minute objects.

3. *Depletion*.—The reduction of vascular action by blood-letting or leeching is very seldom indicated in *asthenopia*, and ought to be had recourse to, only when the patient is robust, and the disease attended by signs of local congestion.

4. *Purgatives*.—Constipation frequently accompanies *asthenopia*, and is likely to aggravate the affection of the eyes. A course of purgatives is often attended by remarkably good effects, and laxatives in such cases ought to be continued regularly in moderate doses.

5. *Alteratives*.—A deranged state of the digestive system, and a faulty secretion from the liver, if not removed by ordinary purgatives, may require small doses of mercury.

6. *Tonics*.—As *asthenopia* has generally been regarded as a disease of debility, tonics chiefly have been employed for its cure. Sulphate of quina and the preparations of iron are the most effectual. I have known many cases greatly relieved by these means. In proportion as the patient takes nourishment and regains strength, the action of the nervous system is in general improved, and the sight invigorated. But it is important to know, that instead of proving beneficial, such medicines sometimes do harm. When *spermatorrhoea* is the cause, this symptom is sometimes increased by every sort of tonic or stimulant, but may be cured by remedies of an opposite kind, and especially by cauterization of the *verumontanum*.

7. *Diet*.—In general, the quantity and quality of the patient's food require to be improved. Nutritive animal food, of easy digestion, should be given. The patient may drink water liberally; but use alcohol in no form, not even in the smallest quantity, unless it is prescribed as a medicine.

8. *Tepid and cold bathing*.—The cold bath, and especially bathing in the sea, must be regarded as one of the most efficacious of tonics. It is not, however, always safe to commence with so energetic a remedy, but better to try tepid and cold sponging, followed by careful friction, before plunging into cold water, whether fresh or salt.

9. *Sedatives*.—The only medicine of this kind which I have tried is belladonna. I have employed it frequently in the form of tincture. It lessens the disposition to fatigue of the eyes in a very remarkable degree. It also diminishes the tendency to seminal discharges. The tincture is made by macerating one ounce of extract of belladonna in one pound of proof spirit for seven days, and straining. The dose is from five to fifteen drops, thrice a-day. Aconite, which so much alleviates nervous headach, is likely to afford similar relief in asthenopia as belladonna, but I have not tried it.

10. *Counter-irritation*.—In cerebral cases, repeated blisters behind the ears and to the back of the head, prove useful.

11. *Cold and warm lotions*.—Temporary benefit is obtained by bathing the eyelids with cold water, vinegar and water, a mixture of sulphuric ether, or sweet spirits of nitre, with cold water, and the like. The subtraction of heat, which follows such application, greatly relieves the feeling of fatigue in the eyes. Fomenting the eyelids with warm water, chamomile tea, poppy decoction, and other warm fluids, also affords temporary relief, and may be used when the weather is cold.

12. *Spirituous and aromatic vapours*.—Exposing the eyes to stimulating vapours, such as that of strong aqua ammoniac, of sulphuric ether, or of a mixture of these, proves useful. The fluid selected may be poured into an egg-cup or eye-glass, previously warmed by being placed for a few minutes in boiling water, and the vessel held close under the eye, so that the vapour may rise into contact with the conjunctiva. This should be continued till the eye begins to water and becomes red, and repeated twice or thrice daily. Wenzel* objects to the use of ammonia, and the like, in this way, and recommends the eyes to be fumigated with the vapour arising from aromatic resins, thrown upon a live coal.

13. *Convex glasses*.—Few patients, not even those of them who are mere children, continue to be long affected with asthenopia, without making use of convex glasses. One of the strongest proofs that the seat of this disease is, in part at least, the apparatus of accommodation, is the fact that the employment of such glasses relieves the symptoms as completely as they do those of presbyopia. The only danger is, that the patient begins with glasses of too short a focus, so that, when age advances, he finds he has forestalled the advantage he might otherwise have derived from glasses adapted to an increasing presbyopia. I have often been consulted by individuals under 20 years of age, who, on account of asthenopia, used convex glasses of as short a focus as 6 or 8 inches.

A child, the subject of asthenopia, engaged in learning his les-

* Op. cit. Vol. i. p. 334

son, complains he cannot see, and repeats the complaint so frequently, especially during candle-light, that his father or grandfather at last says, Try my glasses! The child now sees perfectly, and night after night the loan of the glasses is required before his task can be finished. It would have been better had glasses of the longest focus been selected, which could have enabled the child to read, or better still, had he been put to bed, and the lesson left till day-light.

If we are consulted in time as to the use of convex glasses for asthenopia, all the advice we can give is, to choose those of the longest focus which will answer the purpose wanted. They serve merely as a palliative, but a palliative of great importance to those who but for their aid could not win their bread. They seem to have no effect in removing, neither do they appear to confirm or aggravate the disease.

14. *Cauterisation of the urethra*.—When asthenopia depends on spermatorrhœa, or on masturbation, advantage may be derived from the application of lunar caustic to that part of the urethra which receives the ejaculatory ducts.* Spermatorrhœa appears to be kept up by a chronic inflammation of that part of the urethra, which inflammation the caustic removes. The same remedy renders masturbation painful, so that its repetition is prevented, and the habit broken.

The length of the urethra is to be measured with the catheter. By means of Lallemand's *porte-caustique*, the caustic is then to be applied for an instant to the surface of the verumontanum, immediately anterior to the prostatic portion of the urethra, and the instrument withdrawn closed. This is to be followed by low diet, diluent drinks, and the hip-bath. The inflammation caused by the caustic subsides in about ten days, and then the amendment begins to be perceived. The spermatic discharges becoming fewer, the patient gains strength, and among other signs of improvement, he finds his sight restored to its natural power of sustaining fatigue.

15. *Division of one or more of the muscles of the eyeball*.—The fact, that the greater number of patients who are cured of strabismus by a division of one or other of the muscles of the eyeball, express their conviction that their sight has been improved by the operation, has led to the application of the same practice to the cure of other diseases of the eye, and especially to that of myopia and asthenopia.

M. Phillips appears to have been the first to propose the application of myotomy to the cure of myopia. He attributes this disease to an inordinate action of the obliqui, and recommends the superior oblique to be divided, which allows, he says, the cornea to become less convex, and thus cures the myopia. "Le

* Lallemand, op. cit. Tome iii. p. 392. B. Phillips, in London Medical Gazette, Vol. xxx p. 687. London, 1843.

grand oblique étant coupé, la convexité de la cornée s'est affaissée et la myopie a été guérie."*

M. Guérin proposes to divide the internal and external rectus for the cure of myopia, and thus compares his own views with those of M. Phillips. "J'attribue la myopie à la rétraction des muscles droits, il la met sur le compte des muscles obliques; il la regarde comme le résultat d'une dépression latérale, c'est-à-dire d'un allongement du globe oculaire, et moi d'une dépression antéro-postérieure, c'est-à-dire d'un raccourcissement."† It is scarcely necessary to remark, that M. Guérin's view of the pathology of myopia, viz. that the disease is caused by an antero-posterior depression, or a shortening of the axis of the eyeball, is contrary to the principles of optics. Such a shortening would produce presbyopia, not myopia. His plan of operating may be correct, namely, that of dividing the recti, but his theory of the disease is inadmissible.

The plan of dividing the rectus internus and externus in myopia is very favourably reported on by M. Cunier.‡ Dr Bonnet§ prefers a section of the inferior oblique close to its origin.

Now, granting for the sake of argument, that a division of the muscles of the eyeball, recti, or obliqui, cures myopia, what probability is there that the same operation will cure asthenopia? In myopia, the eye is permanently accommodated to the view of near objects. We divide the external muscles of the eyeball, and the eye acquires the power of accommodating itself to the view of distant objects. What is the state of vision in asthenopia? The eye, in this disease, cannot sustain an accommodation to near objects beyond a certain length of time, but continues perfectly adapted to the vision of distant objects. Is it likely that the same operation will cure both myopia and asthenopia, two diseases, which are so far the opposite the one of the other, that in myopia there is a permanent adjustment of the eye to near objects, while in asthenopia the eye fails to sustain such an adjustment?

Setting aside, however, all theoretical objections, we are bound to consider the results, which are said to have been obtained from the surgical treatment of asthenopia. Mr Adams has published several remarkable cases cured by a division of the rectus internus and externus, and Dr Bonnet a number of others equally relieved by a section of the inferior oblique. The operation requires to be performed on both eyes. The practice I believe to be perfectly safe; but of its efficacy I can say nothing from my own experience. The narratives of Mr Adams and Dr Bonnet bear every appearance of authenticity; yet it is difficult to refrain from characterizing them in the words of Scarpa, as "*istorie di*

* *Annales d'Oculistique*, Tome v. p. 33. Bruxelles, 1841.

† *Ib.* p. 35.

‡ *Ibid.* p. 139.

§ *Ib.* Tome vi. p. 73.

guarigioni sorprendenti, e poco dissimili dai prodigi." A remarkable circumstance is, that Dr Bonnet's section of the inferior oblique is not less efficacious than Mr Adams's division of the two recti.

If the principles which I have endeavoured to establish in the preceding pages be just, a surgical operation to cure asthenopia should be capable not only of restoring to the eye the power of sustaining an adjustment to the view of near objects, but also of removing the morbid condition of the retina, which constitutes a part of the disease. In putting the operative method of cure to the test of experience, the power of the eyes to undergo fatigue, both before and after being operated on, must not be estimated from any vague or exaggerated statements made by the patient, but from the subject of careful and exact observation by the practitioner.

Glasgow, 4th April 1848.

ART. V.—Several Cases of Uterine Hemorrhage, and a Case of Hæmaturia, successfully treated by the internal use of Gallic Acid.* By ROBERT STEVENSON, M. D. Ed. and Member of the Royal Medico-Chirurgical Society, Doctor of Medicine, Surgery, and Midwifery of the University of Tübingen, &c.

JANE JOHNSTON, a servant girl, 32 years of age, of plethoric habit, had, about two years ago, bathed in very cold water when covered with perspiration. Since that time the menstrual discharge has been very irregular, and she suffered from frequent pains in the stomach and abdomen with hiccup. On one occasion, in July last, she was seized with symptoms of violent colic, which continued for six days. The catamenial secretion, which had not appeared since May, now declared itself and mitigated her sufferings. She describes the effusion as being more copious, and lasting longer than on preceding occasions. From this period she menstruated more regularly but profusely each time. In the intervals she complained of vertigo, of a sense of oppression in the præcordial region, and was sometimes seized with violent efforts to vomit.

On the evening of 18th January last, pains in abdomen returned without any known cause. Towards morning she was better, and slept for several hours till again roused by a return of the pain, coldness of the lower extremities, cold sweat and hiccup. Half an hour after this she passed an unusual quantity of blood *per vaginam*.

* Gallic acid was discovered by Scheele when experimenting upon nut-galls, (Ch. Gmelin. *Einleitung in die Chemie*. Vol. ii. p. 1142.) It was employed at one time as an anthelmintic, but without any benefit, and fell rapidly into disuse. Its beneficial use in uterine hæmorrhage was suggested to me by Dr Graham Weir; and Professor Simpson informs me, he has had occasion to administer it in the same disorder, in the form of pill, and with success. Of the chemical characteristics of the gallic acid, and of its physiological effects, more ample details will be given in a future number of this Journal.

She now for the first time applied for medical assistance. I saw her at 11 P. M., twelve hours after the first appearance of the pain. The patient was lying on her back in a very exhausted condition, with pale anxious countenance; the eyes sunk; the pupils dilated; the hands and feet covered with cold perspiration; the abdomen tense and inflated, and the hypogastric region extremely tender to touch. The pulse was quick, feeble, and intermittent during persistence of the pains, regular at other times. The blood she had passed amounted to at least one pound. There were frequent vomitings and fits of fainting. Notwithstanding this alarming condition of exhaustion, I neither ordered wine nor any other stimulant, and thought it not advisable to do so until the pains were removed. She was directed to take half an ounce of castor oil with ten minims of laudanum in a little anise water and mucilage; cold cloths to be applied to the hypogastric region; free ventilation to be observed; and the lower extremities to be frictioned with warm flannels.

19th, 9 A. M. The pains had ceased; had two natural stools. The countenance was more pale and anxious than yesterday night; the pulse was 110, regular, feeble, scarcely perceptible at the wrist; had continued to pass blood during the whole of the night. It was impossible to ascertain the exact amount, being mixed in the vessel with urine and fecal matter, but there could not have been less than twenty ounces. In this condition a glass of port-wine was administered, and ordered to be repeated every four hours; and I resolved to administer the gallic acid in eight-grain doses in the form of powder, to be given every third hour:—

R. *Acidi Gallici*, gr. viij.; *Pulv. Cinnamomi* gr. v. *M. fiat Pulv. et habeat hujusmodi sex. Sumatur una statim et repetatur hora quaque tertia.* Cold cloths to be continued.

3 P. M. Great exhaustion; pulse 130, feeble; fits of fainting, from which it was difficult to rouse the patient; complained of much dizziness and occasional pains in hypogastric region; had passed since nine this morning six ounces of blood, of highly offensive smell, not coagulated; great thirst. A tablespoonful of beef-tea was ordered to be given immediately and repeated every two hours; the powders were to be continued as prescribed this morning. The wine was stopped.

20th, 9 A. M. Pulse 110, stronger and regular; countenance flushed; heat of skin moderate, perspiring gently; had slept a short time towards morning; passed since five o'clock yesterday evening three ounces of blood mixed with mucus; smell not offensive; came away in small clots coagulated; had one stool, in quality and consistence natural. She had now taken seven powders altogether. I ordered these to be continued, and the beef-tea to be given at longer intervals.

5 P. M. The countenance more anxious and pale than this morning; pulse 120, feeble, though distinctly perceptible; hemorrhage decreased; smell not so offensive. Powders to be continued. She complained of great cold in the hypogastric region, so that cold cloths were ordered to be continued at longer intervals. I ordered an opiate at bed-time of twenty-four minims of laudanum.

20th, 12 A. M. Passed a quiet night ; pulse 110, full, regular ; countenance animated ; complained of headach and pain in the eyes ; passed but a few drops of blood during the night, but towards morning about half a drachm ; skin warm, perspiring gently. Powders to be taken as before ; cold cloths to be discontinued ; ordered a little jelly.

On visiting the patient in the course of the afternoon of this day, I found her considerably improved. Pulse full and regular ; head free of pain ; no uneasiness in the hypogastric region ; hæmorrhage had entirely ceased. She was now ordered to take one powder daily. Some days after this I found her convalescent. She has had no return of hæmorrhage.

Case II. *Hæmaturia*.—J. Gordon, 14 years of age, had been passing blood with his urine for several months ; his mother said he had received a blow in the lower abdomen from one of his school-mates six months ago. She noticed, the day after this occurrence, for the first time, that his urine was mixed with blood. The quantity had been very inconsiderable, except on one occasion, when the urine was so deeply saturated that she became very uneasy, and now sent for a medical gentleman. Turpentine, decoction of rhatania, and several other remedies had been administered, but without succeeding in entirely arresting the hæmorrhage. On the evening of Tuesday, 28th November, he again passed an inordinate quantity of blood, and I was requested to visit him. I saw him an hour after. The patient was lying on his right side, with the leg drawn up on abdomen, apparently in great suffering. The face was pale, and extremely anxious ; the pulse quick and feeble ; the tongue furred. He complained of considerable uneasiness in the lower part of the abdomen, which, upon pressure, was increased, and of severe lancinating pain at the margin of the anus. I examined the contents of the vessel in which he had passed his urine, which were as follows : The superior layer, some lines in thickness, was of a milky-white colour, resembling a thick emulsion ; the middle portion, nine-tenths of the whole, was of the colour and consistence of the lees of wine ; the bottom of the vessel was covered with pure blood, both liquid and coagulated ; the clots varied from the size of a pea to that of a nut. Specific gravity 1.0225 : 3.9226.

I ordered a warm bath immediately, and one ounce of castor oil, and a draught to be taken in the morning, consisting of one ounce of camphor mixture with magnesia, ten drops of tincture of hyoscyamus, and one drachm of syrup of squills, with demulcent drinks.

29th, 11 A. M. The patient passed a restless night ; the skin was hot and dry ; great thirst ; tongue furred ; pulse 120, feeble ; castor oil operated twice ; passed but a small quantity of urine, not above an ounce, half of which was blood mixed with a small quantity of mucus. Since three this morning has passed no urine at all. He now complained of great uneasiness in the abdomen with a great desire to void his urine. This retention of urine, I ascertained to be owing to clots of blood obstructing the urethra. I succeeded in washing down these clots with warm water. The patient then passed

at short intervals, and within the space of half-an hour, eight ounces of urine, which, after remaining some time in the vessel, presented the same appearance as that described yesterday; painful feelings in hypogastric region and margin of anus were now alleviated. I ordered the warm bath to be repeated, and prescribed the gallic acid as in the following formula.

R. Acidi Gallici, gr. xxiv; Pulv. Aromatic. ʒss. Misce fiat pulvis divide in chartulas aequales viij. Sign. Sumat unam statim et repet. hora quaque tertia.

A wine-glass with equal parts of white wine and water to be given every fourth hour.

80th, 12 A. M. Patient passed an easier night; had occasional relapses of pain; pulse 108, thready and small; skin warm, perspiring; tongue moist and clean; passed, since my visit yesterday morning, half-a-pint of bloody urine; quantity of blood diminished; no mucus; specific gravity 1.0223. Powders to be continued; ordered a little beef-tea.

1st December, 10 A. M. Patient slept well; pulse 100, feeble, but very distinctly perceptible; bowels free; urine but slightly tinged with blood. Continue warm bath and powders.

2d December 1 P. M. Countenance flushed; pulse 106, firm; appetite good; pains every where removed; urine natural. I now sounded the bladder with a steel bougie, No. 3. There was no sensation of stone. Whilst withdrawing the sound, a small quantity of liquid blood and mucus came away; complained of no uneasiness during the operation. Ordered a little meat; warm bath to be discontinued; one powder to be taken twice a-day.

3d December. Pulse 90, firm; countenance natural in expression; eyes bright; heat of skin natural; urine high-coloured, lateritious sediment, no blood nor mucus. Powder to be discontinued. From this date the boy gradually gained his strength; he is now in active employment, and has had no return of hæmorrhage.

Case III. On Tuesday, 2d of February, I was requested to visit Mary Slater, a widow, aged 36, of delicate habit, the mother of four healthy children. She had never miscarried. Since the birth of her fourth child, three years ago, she had enjoyed better health than in the first years of her marriage. Till May last, her menstrual flux had appeared at regular intervals, but varied much in quantity, sometimes scanty, at others very profuse. On one occasion in August, the catamenia was more profuse than usual, and was attended with severe pains in the loins and abdomen. She described those pains as being equal in violence, and imitate completely in sensation the most violent, parturient efforts. Shortly afterwards, in the early part of September, when busy washing, her ordinary occupation, she was seized with a lancinating pain in the stomach, and this was followed by a violent attack of hæmatemesis. She sent for medical assistance, and was so far restored in health as to be able to go about the house and fulfil her domestic occupations. Since this attack of hæmatemesis, however, the menstrual secretion had never declared itself, although a judicious course of medicine had been prescribed, and suitable diet attended to.

At 6 o'clock in the evening she sent for me. The patient complained of general uneasiness ; a fulness in the head ; and a degree of lassitude which obliged her to lie down ; she fell asleep, but was aroused half-an hour afterwards by pains in the lower abdomen, and passed blood from the uterus to a considerable amount. I saw her again at 9 P. M., three hours from the time when the effusion had taken place. The vessel contained two pounds of fluid, more than half of which was urine, the remainder was blood. She was lying down in a state of imperfect consciousness, meaning lowly, and now and then casting about her arms. Pulse quick, feeble, irregular ; respiration quick and oppressive ; heart's action feeble, bruit indistinct ; extremities cold, and a cold sweat covered the surface ; blood was continuing to flow. In this alarming condition I ordered a teaspoonful of whisky to be given, and to be repeated at intervals as consciousness returned. At the same time the most active efforts were employed externally to arouse the heart's action ; frictions of warm flannel over the chest and abdomen were assiduously employed, and sinapisms were applied to the feet.

9 P. M. Reaction had taken place ; pulse quick, distinct ; respiration easier ; general heat of body ; return of consciousness ; had passed two ounces of blood mixed with mucus of a very offensive smell. Examined *per vaginam* no disease was ascertained. This slight reaction, however, and these glimmering hopes of recovery, were soon succeeded by indications of sinking,—the same alarming symptoms as before, with hiccup. Cordials were freely administered ; the frictions assiduously continued ; vinegar and water were injected *per vaginam*, and plugging was resorted to. Reaction occurred once more, and I then directed eight grains of gallic acid to be taken with ten grains of sugar every third hour ; the sinapism to be removed, and friction to be discontinued ; half-a-glass of sherry every two hours during night.

Wednesday, 10 A. M. Pulse 120, small ; respiration easy ; bowels free ; had two stools, natural in colour and consistence ; plug came away at 11 o'clock, covered with clotted blood ; passed six ounces since, partly fluid, partly coagulated ; smell less offensive ; examined again *per vaginam*, no abnormal condition of uterus was ascertained. Ordered wine to be administered at longer intervals ; free ventilation ; cold cloths to be applied to the lower abdomen ; powders to be continued.

7 P. M. Pulse 100, small, regular ; countenance anxious ; complains of great thirst, and a gnawing pain in the stomach, and general uneasiness in the abdomen ; blood clotted, amounting to two ounces. Ordered beef-tea ; powders to be continued.

Thursday, 10 A. M. Pulse 95, firm ; countenance pale ; eyes bright and expressive ; tongue clean ; skin perspiring gently ; passed ten ounces of blood during night-time ; had slept a little in the morning ; pain in stomach and abdomen much alleviated ; powders as before ; cold cloths discontinued.

Friday, 12 A. M. Patient passed a quiet night ; slept well towards morning ; had passed a few drops of liquid blood and mucus ;

bowels free ; pulse 90, full and firm ; complained of dizziness and of a severe aching pain in the course of the region of the cervical spine ; appetite good. Ordered a mustard blister to be applied over the painful part ; two powders to be taken daily ; as to diet, a little meat and half-a-tumbler of porter.

Saturday, 3 P. M. Pulse 85 ; expression of countenance improved ; pain in cervical region alleviated ; passed no blood whatever. One powder to be taken daily.

Tuesday, 10 A. M. Convalescence fairly established. Ordered to keep her bed some days longer. At the close of the week, patient had quite recovered, and was able to walk about the house. I have seen her since ; there has been no return of hæmorrhage, and her health is on the whole considerably improved.

CASE IV.—Anne Glass, a milliner's apprentice, twenty-three years of age, of plethoric habit, regular and sober in her conduct, applied to me for advice on the 23d February. She complained of loss of appetite, of a headach on rising in the morning, of inability to take exercise without feeling considerable lassitude ; slept badly, and was frequently disturbed with unpleasant dreams. The feet were swollen and slightly cedematous. These symptoms, she remarked, came on three weeks previously ; she complained to her mistress, who allowed her to retire earlier from her work than her comrades. In the day-time she used to fall asleep over her work ; had alight cough and expectoration, and sometimes a burning pain in the præcordial region with violent palpitations. On examining by auscultation I found the sound of respiration as well as the sounds of the heart perfectly normal. With these dyspeptic symptoms she complained of the menstrual flux for some months past, as having been much more scanty than it had habitually been. In the intervals of menstruation she said she was liable to profuse attacks of epistaxis. Sometimes she used to be relieved by the free admission of cold air with local applications of cold vinegar and water, assisted on two occasions by abstraction of blood from the arm. The epistaxis afforded no relief to the general symptoms of uneasiness. I directed a powder consisting of fifteen grains of rhubarb, one grain and a-half of aloes, and eight grains of subcarbonate of soda, to be taken every morning ; and one table-spoonful of a mixture, consisting of four ounces of compound decoction of aloes, with one scruple of the ammonio-tartrate of iron, to be taken daily. At the same time, I enjoined suitable diet and regimen. Two weeks afterwards she called upon me, and was much improved in health. The cedematous swelling of legs had disappeared ; the tongue was clean, and pulse natural. I gave some advice as to diet, and recommended much exercise in the open air. On the 22d, Wednesday, her mistress called upon me and requested me to visit her ; she was living with her mother at Newington. I saw her at three o'clock on the same day. A profuse hæmorrhage from the uterus had come on since 12 A. M. Previous to this attack she had felt no local nor general uneasiness, and having menstruated more copiously than usual a week previously, she knew not to what cause she could ascribe it. she was now sick and faint ; pulse quick and feeble. I measured

the blood she had voided ; it amounted to a pound and a-half ; it was quite pure and arterial. Upon making an examination *per vaginam* I found the *os uteri* not at all dilated, and, with the exception of an unusual degree of heat in the vagina, there was no abnormal condition that I could ascertain. I soaked some lint in a strong solution of alum, which on some occasions I had found efficacious in arresting hæmorrhage, and plugged it as high up as the *os uteri*. I recommended her to be kept cool and quiet, and to have ten drops of the aromatic sulphuric acid every two or three hours ; to have her drink cool ; and if very faint, to have a little brandy.

10 P. M. Half-an hour after leaving her, she had a desire to go to the stool, when the plug came out and the bleeding returned. I again introduced a plug steeped in a still stronger solution, and administered a little brandy. Having visited a patient in the neighbourhood, I returned half-an hour afterwards. The plug had remained firm, but it had not as yet stopped the hæmorrhage. Pulse was quick, feeble, and intermitting. The blood did not flow in a stream but by a rapid succession of large drops. In point of consistence I could not distinguish it from healthy arterial blood. Notwithstanding this diminution of vital power, until now she had no syncope, and was conscious of all that was going on around her. I now prescribed the gallic acid in doses of six grains, in form of powder, and to be taken every three hours. Having to send for it to the Apothecaries' Hall in South Hanover Street, in consequence of the nearer apothecaries not having it at hand, it was half-past eleven before the first powder had been administered. As I was leaving she had a fit of fainting, from which I had much trouble in arousing her.

Thursday, 9 A. M. Countenance ghastly pale ; eyes sunk and glassy ; breathing hurried, stertorous ; pulse quick, small, and thready, irregular. Hæmorrhage, however, had partially ceased towards morning. Blood amounted to five ounces, it was clotted and darker ; a small quantity of mucus was mixed with it ; bowels moved three times ; had a fit of fainting during night time. She complained of a pain in sacral region of the spine. I ordered stronger cordials, and the powder to be repeated every two hours.

3 P. M. Reaction had taken place ; pulse distinct, 120 ; countenance composed ; partial sweats in the back and thorax ; collected and asked for drink ; has passed a small quantity of blood. I could not ascertain the exact amount. Ordered cordials to be given in longer intervals ; some beef-tea to be taken immediately, and repeated to night ; powder to be given as before.

Friday, 12 A. M. Slept some part of the night ; moaned in her sleep ; pulse 110, firm and regular ; flooding had nearly ceased, a few drops alone came away at intervals of two or three hours ; urine high-coloured ; bowels free ; appetite good ; diet and regimen as before ; a little meat instead of beef-tea in the middle of the day.

Saturday, 10 A. M. Had slept a good deal during the night ; face stupid, flushed, showing astonishment but answering coherently ; pulse 80, of natural strength ; discharged some mucus unmixed with blood ; no dejection ; thirst diminished ; complained of pains

in sacral portion of spine. I ordered a little castor-oil with a few drops of laudanum to prevent it acting too strongly ; and the powder to be taken twice-a day instead of thrice.

Sunday, 12 P. M. Slight discharge from vagina, partly mucus, partly blood ; no unpleasant sensations, strength returning. She continued, however, very weak for some days, although pulse was firm and natural. I enjoined the horizontal posture, and a powder to be taken every day. She gradually recovered, and is now enjoying good health.

12, *Dublin Street*,

May 30th 1843.

ART. VI.—*Vital Statistics, and Pathological Contributions.*

By ROBERT BOYD, M. D., Resident Physician, St Mary-lebone Infirmary. (Continued from Vol. lix. p. 65.) To which are added, *Notes on Morbid Parts.* By GEORGE GULLIVER, F. R. S.

THE great importance of an exact knowledge of the diseases of the poor has now been fully recognized, and the object of these publications is to assist in giving more precise materials for accurate conclusions than we yet possess. The communications have hitherto been confined to a dry recital of facts, inferences having been avoided till the series may be sufficiently completed, to admit of general or particular deductions ; especially in relation to the frequency, complications, connections, and mortality, of the diseases most obnoxious to the poor, in a large metropolitan district.

The institution affords ample opportunities for observation, particularly in reference to the comparative state of the organs and tissues after death, the diseases of both sexes, and of all ages. The facts have been carefully methodised, for a term of three years, commencing January 1st 1840, and ending December 31st 1842, from notes taken at the time.

In the present communication, an analysis of the diseases admitted into the Infirmary in 1841 is given, with an account in continuation of the *post mortem* appearances in those who have died from diseases of the abdominal viscera, and of the chest, excepting only phthisis.

Of all the diseases yet recorded, pneumonia has been by far the most fatal. It has generally been the immediate cause of death in the eruptive fevers, and whooping-cough, of children, and in a great variety of chronic maladies of adults, which the detailed cases will show, as will be more particularly pointed out in the conclusion.

My grateful acknowledgements are due to Mr Gulliver, for his kind assistance on many occasions ; and it is hardly necessary for me to allude to the value of his observations, appended to this paper.

ANALYTICAL TABLES of the cases of diseases, treated at the Infirmary of the Parish of St Marylebone for the year 1841.

The chief object held in view in the arrangement of the following tables has been to show the influence of age, of sex, and of season, upon disease, as occurring amongst the pauper population of this section of the metropolis, during one year.

The first table includes the total number of the cases treated, with the exception of about 900, of such a nature as would only be admitted to the infirmary of a workhouse, or establishment similarly constituted. This table contains also the age, the sex, and the results of disease, at the four periods of life.

The second table shows in a more condensed form, the prevalence, and the mortality of each class of disease, according to sex, and the period of life.

The third table comprises the whole of the cases contained in the preceding, and the rate of mortality, at the different quarters of the year.

The fourth table contains the gross number of patients admitted into the lying-in ward and into the infirmary in each quarter; the average number under treatment and average duration of their residence in the house; distinguishing them into medical and surgical.

An abstract of the expenditure of the establishment has been added, with the average number of patients of all classes in-door and out.

In the first table it may be observed, that the females far outnumber the males. This fact has been remarked in former years; as also that the mortality among the females is inferior to that of the former, being 1 in 6, the latter 1 in 5.3.

When we look at the different classes of disease, singular facts are presented; in those of the digestive organs, there is a preponderance of one-third on the part of females. This disproportion depended mainly on the more frequent occurrence of inflammatory affections of those organs in the female than the male, the number and the mortality of those affections being more than twice greater in the former than the latter. The tendency to diarrhoea was nearly equal in both classes, but the mortality was greatest in the males.

In the diseases of the respiratory organs the numbers were nearly alike in both sexes, but the mortality was greatest among males, being about 48½ per cent., and in females 37 per cent. The present tables confirm the incorrectness of that opinion, which assigns a greater mortality from pulmonary consumption to women than to men.

Dropsy was most frequent amongst females.

The diseases of the vascular system fell more heavily on the females than the males. To some extent this is owing to derange-

ment in menstruation ; and so far as concerns the heart, the preponderance is owing to affections of that organ being less frequently complicated with disease of the respiratory organs in woman than in man.

Nothing particular is to be remarked of diseases of the genito-urinary organs. Venereal cases, however, have been much more numerous among females than males.

Diseases of the nervous system have fallen most heavily on females, which may be accounted for, from hysteria having been exclusively confined to them, and also the greater frequency of insanity among them in this house. The rate of mortality, however, is nearly equal in both sexes, from the more frequent occurrence of apoplexy and *delirium tremens* in males.

Diseases of the locomotive organs and cellular tissue, are, as might have been expected, more frequent in males than females.

Fever seems to affect both sexes almost indifferently ; but in those of an eruptive kind, the mortality has been greatest in the female, and chiefly confined to the first period of life. So much for the comparative frequency of different diseases, and the mortality in both sexes.

An analysis of the second table shows us, that diseases of the digestive organs chiefly prevail between twenty and forty-five years of age, the mortality being greater as life advances.

In the diseases of the respiratory organs the prevalence was greatest after 45, but the mortality was enormous in infancy. This fact is so striking, that, if returns from other institutions correspond with the present, it will call loudly for the necessity of excluding young children from crowded establishments in large towns.

Diseases of the vascular system prevailed most in adult and advanced life, and were most fatal at the latter period.

Diseases of the nervous system were most numerous between twenty and forty-five, but the greatest mortality occurred after that period.

There were but few cases of disease in the locomotive organs and cellular tissue, until after the first period of life, when they became pretty equally distributed over the three last periods.

The peculiarities respecting fevers, have already been pointed out.

The effects of season upon particular diseases, as is shown in the third table, are very remarkable. Those of the digestive organs are most numerous, but least fatal during the summer months. Those of the respiratory organs most frequent in winter.

Diseases of the vascular system were most numerous in the first quarter ; the mortality was greatest in the first and last quarters ; syphilitic cases were most numerous in the last quarter. This may partly be owing to the inclemency of the weather forcing a greater number to seek an asylum at that season.

Common fever was most frequent and fatal during the first quarter, and least so in the last quarter.

From the fourth table it may be observed, that the medical and surgical admissions during the year have been nearly equal, the mortality among the former being about 25 per cent., and among the latter, about 3 per cent.

The average daily number of patients treated were as follows :

In the Infirmary, . . .	230
Workhouse patients, . .	102
Visited at their own houses, .	136
Prescribed for at the Infirmary, .	163
Total, . . .	631

Annual expenditure, L. 13 for each bed, in addition to the following :

For drugs and chemicals, . . .	£ L. 531	3	9
Wine and spirits, . . .	178	9	5
Surgical instruments, . . .	77	14	1
Nurses' wages, . . .	288	8	6
Salaries to medical officers, . .	369	8	6
Total, . . .	1445	4	3

Being a decrease of L. 5, 18s. 1d. compared with the preceding year. (Vide Edin. Med. and Surg. Journ. Vol. lvii. Ap. 1842.)

Abridgement of an Analytical Table of the Diseases admitted to the St Marylebone Infirmary in the year 1841.

Diseases.	Ages.	Cases.		Results.								Tot.	Mortality.
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
Digest. Organs	Under 7 years.	22	15	18	14	...	...	...	...	4	1	37	1 in 7.4
	From 7 to 20	10	12	9	12	1	...	...	...	...	...	22	...
	20 to 45	20	44	18	36	1	2	...	1	1	5	64	1 in 10.6
	45 & up.	20	31	12	22	4	1	...	2	4	6	51	1 in 5.1
	Totals,	72	102	57	84	6	3	...	3	9	12	174	1 in 8.3
Resp. Organs	Under 7 years.	48	35	20	17	2	...	...	...	26	18	83	1 in 1.9
	From 7 to 20	42	33	38	25	1	1	...	3	3	4	75	1 in 10.5
	20 to 45	76	77	19	30	17	19	5	2	35	26	153	1 in 2.5
	45 & up.	69	98	16	22	13	22	4	8	36	46	167	1 in 2
	Totals,	235	243	93	94	33	42	9	13	100	94	478	1 in 3 near
Dropsy	Under 7 years.	...	1	...	1	...	...	...	...	...	...	1	...
	From 7 to 20	2	1	2	1	...	...	...	...	...	...	3	...
	20 to 45	3	7	1	1	...	4	...	1	2	1	10	1 in 3.3
	45 & up.	7	15	1	1	1	1	...	1	5	12	22	1 in 1.3
	Totals,	12	24	4	4	1	5	...	2	7	13	36	1 in 1.8
Sero-fula.	Under 7 years.	10	6	2	...	3	3	2	1	3	2	16	1 in 3.3
	From 7 to 20	7	6	...	2	6	3	2	...	...	...	13	...
	20 to 45	2	2	1	...	2	...	...	...	...	1	4	1 in 4
	45 & up.	...	...	...	...	...	...	...	...	...	...	...	...
	Totals,	19	14	3	2	11	6	4	1	3	3	33	1 in 5.5

Diseases.	Ages.	Cases.		Results.								Tot.	Mortality
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
Vascu- lar System	Under 7 years.	2	9	2	5	...	3	...	...	...	1	11	1 in 11
	From 7 to 20	...	4	...	3	...	...	...	...	...	1	4	1 in 4
	20 to 45	3	8	2	5	1	1	...	1	...	1	11	1 in 11
	45 & up.	13	9	4	2	1	1	1	...	7	6	22	1 in 1.7
	Totals,	18	30	8	15	2	5	1	1	7	9	48	1 in 3
Genito Urin. Organs	Under 7 years.	...	1	...	1	...	...	...	...	...	...	1	...
	From 7 to 20	3	5	3	5	...	...	...	...	...	...	8	...
	20 to 45	4	11	3	6	...	1	1	2	...	2	15	1 in 7.5
	45 & up.	11	11	5	1	2	2	1	...	3	8	22	1 in 2
	Totals,	18	28	11	13	2	3	2	2	3	10	46	1 in 3.5
Vene- real.	Under 7 years.	...	...	...	...	...	...	...	...	...	...	...	...
	From 7 to 20	8	47	8	47	...	...	...	...	...	...	55	...
	20 to 45	6	18	6	17	...	...	...	...	...	1	24	1 in 24
	45 & up.	1	...	1	...	...	...	...	...	...	...	1	...
	Totals,	15	65	15	64	...	...	...	...	...	1	80	1 in 80
Nerv. System	Under 7 years.	5	6	2	3	1	2	...	1	2	...	11	1 in 5.5
	From 7 to 20	8	28	5	22	...	3	3	3	...	...	36	...
	20 to 45	53	70	17	32	12	19	16	17	8	2	123	1 in 12.3
	45 & up.	27	69	7	21	5	17	4	12	11	19	96	1 in 3.2
	Totals,	93	173	31	78	18	41	23	33	21	21	266	1 in 6.3
Diseas. of the Eye.	Under 7 years.	5	6	5	6	...	...	...	...	...	...	11	...
	From 7 to 20	14	18	13	18	...	...	1	...	...	...	32	...
	20 to 45	1	5	1	3	...	1	...	1	...	...	6	...
	45 & up.	2	4	1	3	...	...	1	1	...	...	6	...
	Totals,	22	33	20	30	...	1	2	2	...	...	55	...
Locom. Org. & Cellul. Tissue.	Under 7 years.	10	10	8	9	...	1	1	...	1	...	20	1 in 20
	From 7 to 20	86	43	80	40	3	3	3	...	...	...	129	...
	20 to 45	56	62	52	57	2	3	1	2	1	...	118	1 in 118
	45 & up.	54	67	37	50	10	10	1	...	6	7	121	1 in 9.3
	Totals,	206	182	177	156	15	17	6	2	8	7	388	1 in 25.8
Skin Dis- eases.	Under 7 years.	25	26	25	26	...	...	...	...	...	...	51	...
	From 7 to 20	40	68	40	68	...	...	...	...	...	...	108	...
	20 to 45	1	6	1	5	...	...	...	1	...	...	7	...
	45 & up.	7	10	7	10	...	...	...	...	...	...	18	...
	Totals,	73	110	73	109	...	...	...	1	...	...	189	...
Erup. Fever.	Under 7 years.	33	36	28	24	1	...	...	...	2	9	69	1 in 6.2
	From 7 to 20	10	14	9	12	...	...	...	...	...	1	24	1 in 24
	20 to 45	3	8	3	8	...	...	...	...	...	...	11	...
	45 & up.	1	8	1	7	...	1	...	...	...	...	9	...
	Totals,	47	66	41	51	1	1	...	...	2	10	113	1 in 9.4
Fever.	Under 7 years.	4	5	4	4	...	...	...	...	...	1	9	1 in 9
	From 7 to 20	13	27	13	27	...	...	...	...	...	...	40	...
	20 to 45	14	21	11	18	...	...	...	...	3	3	35	1 in 5.8
	45 & up.	13	11	11	9	...	...	...	...	2	2	24	1 in 6
	Totals,	44	64	39	58	...	...	...	...	5	6	108	1 in 9.8
Ca- chexia.	Under 7 years.	4	2	4	1	...	...	...	...	...	1	6	1 in 6
	From 7 to 20	1	...	1	...	...	...	...	...	...	...	1	...
	20 to 45	...	1	...	1	...	...	...	...	...	...	1	...
	45 & up.	...	1	...	1	...	...	...	...	...	...	1	...
	Totals,	5	4	5	3	...	...	...	...	...	1	9	1 in 9

Diseases.	Ages.	Cases.		Results.								Tot.	Mortality.
		M.	F.	Cured.		Relvd.		Incur.		Dead.			
				M.	F.	M.	F.	M.	F.	M.	F.		
Desti- tution.	Und. 7 yrs.	...	...	...	...	...	...	...	...	...	...	...	...
	Fm. 7 to 20	1	1	...	...	1	1	...	...	...	...	2	...
	20 to 45	...	1	...	...	...	1	...	...	...	...	1	...
	45 & up.	...	...	...	...	...	...	...	...	...	...	...	...
Old Age.	Totals,	1	2	...	...	1	2	...	...	...	...	3	...
	...	...	1	...	...	...	...	...	...	...	1	1	1 in 1
	Aggregate,	880	1141	576	761	88	126	47	60	166	189	2021	1 in 5.69

TABLE II. Cases and Deaths of Males and Females at the four periods of life, in each class of Diseases.

Diseases.	Ages	Cases.		Deaths.		Rate of Mortality.	
		M.	F.	M.	F.	Males.	Females.
Digest. Organs.	Under 7 years	22	15	4	1	1 in 5.5	1 in 15
	From 7 to 20	10	12	...	...	...	...
	20 to 45	20	43	1	4	1 in 20.	1 in 10.7
	45 & up.	20	32	4	7	1 in 4.7	1 in 4.5
	Totals,	72	102	9	12	1 in 7.8	1 in 8.5
Respiratory Organs.	Under 7 years	52	35	29	18	1 in 1.8	1 in 1.9
	From 7 to 20	42	33	3	4	1 in 14	1 in 8.2
	20 to 45	76	77	36	25	1 in 2.1	1 in 3
	45 & up.	65	98	32	47	1 in 2	1 in 2
	Totals,	235	243	100	94	1 in 2.3	1 in 2.7
Vascular System.	Under 7 years	2	9	...	1	...	1 in 9
	From 7 to 20	...	4	...	1	...	1 in 4
	20 to 45	3	8	...	1	...	1 in 8
	45 & up.	13	9	7	6	1 in 1.8	1 in 1.5
	Totals,	18	30	7	9	1 in 2.5	1 in 3.3
Genito-Urinary Organs.	Under 7 years	...	1	...	...	...	...
	From 7 to 20	3	5	...	...	...	...
	20 to 45	4	11	...	2	...	1 in 5.5
	45 & up.	11	11	3	11	1 in 3.6	1 in 1
	Totals,	18	28	3	13	1 in 6	1 in 2.5
Nervous System.	Under 7 years	5	6	2	...	1 in 2.5	...
	From 7 to 20	8	28	...	...	...	...
	20 to 45	53	70	8	2	1 in 6.6	1 in 35
	45 & up.	27	69	11	19	1 in 2.4	1 in 3.6
	Totals,	93	173	21	21	1 in 4.4	1 in 8.2
Locomotive Organs & Cellular Tissue.	Under 7 years	10	10	1	...	1 in 10	...
	From 7 to 20	86	43	...	...	...	...
	20 to 45	56	62	1	...	1 in 56	...
	45 & up.	54	67	6	7	1 in 9	1 in 9.5
	Totals,	206	182	8	7	1 in 25.7	1 in 26
* Eruptive Fevers.	Under 7 years	31	33	2	9	1 in 15.5	1 in 3.6
	From 7 to 20	9	13	...	1	...	1 in 13
	20 to 45	3	8	...	...	...	...
	45 & up.	1	8	...	...	...	...
	Totals,	44	62	2	10	1 in 22	1 in 6.2

* Small-pox cases omitted.

TABLE III.—Mortality in each Quarter of the Year, of the various classes of Diseases.

Diseases.	Period of Year.	Cases.	Deaths.	Rate of Mortality.
Digestive Organs,	1st Quarter,	36	6	1 in 6
	2d do.	47	5	1 in 1.6
	3d do.	55	5	1 in 11
	4th do.	36	5	1 in 7.2
	Total,	174	21	1 in 8.2
Respiratory Organs,	1st Quarter,	232	68	1 in 3.3
	2d do.	93	44	1 in 2.1
	3d do.	70	30	1 in 2.3
	4th do.	93	52	1 in 1.8
	Total,	478	194	1 in 2.5
Vascular System,	1st Quarter,	16	7	1 in 2.3
	2d do.	6	1	1 in 6
	3d do.	13	3	1 in 4.3
	4th do.	13	5	1 in 2.6
	Total,	48	16	1 in 3
Venereal,	1st Quarter,	16	—	—
	2d do.	18	—	—
	3d do.	15	—	—
	4th do.	31	1	1 in 31
	Total,	80	1	1 in 80
Genito-Urinary Organs,	1st Quarter,	14	5	1 in 2.8
	2d do.	12	3	1 in 4
	3d do.	11	5	1 in 2.2
	4th do.	9	3	1 in 3
	Total,	46	16	1 in 2.8
Nervous System,	1st Quarter,	63	12	1 in 5.2
	2d do.	70	9	1 in 7.7
	3d do.	65	10	1 in 6.5
	4th do.	68	11	1 in 6.1
	Total,	266	42	1 in 6.3
Locomotive Organs & Cellular Tissue,	1st Quarter,	140	8	1 in 17.5
	2d do.	79	1	1 in 79
	3d do.	74	2	1 in 37
	4th do.	95	4	1 in 23.7
	Total,	388	15	1 in 25.8
Eruptive Fevers,	1st Quarter,	24	0	—
	2d do.	12	1	1 in 12
	3d do.	7	1	1 in 7
	4th do.	63	11	1 in 5.7
	Total,	106	13	1 in 8.1
Fever,	1st Quarter,	44	8	1 in 5.5
	2d do.	30	1	1 in 30
	3d do.	20	2	1 in 10
	4th do.	14	0	—
	Total,	108	11	1 in 9.8

TABLE IV.—The whole of the cases admitted in each quarter, and their average time under treatment.

Quarter	L. in Ward.	Admitted.		Aver. No. in Infirmary.		Average stay in Infirmary.	
		Med.	Surg.	Med.	Surg.	Med.	Surg.
to 31st Mar.	40	496	501	121	152	26½ days	31½ days
30th June,	38	304	342	108	117	22½ do.	26 do.
31st Oct. .	52	267	279	89	91	19½ do.	24½ do.
31st Dec. .	70	419	329	94	100	21½ do.	23½ do.
Total,	200	1480	1451	412	450		

TABLE II.—PNEUMONIA, (FEMALES) continued.

Case 399.—Aged 2 months. Slight cough and shortness of breathing for some days before death.

Head.—Brain normal.

Chest.—Lobular pneumonia in first stage in a portion of the lower lobes of each lung; weight of right lung, 2 ounces and 2 drachms; left, 2 ounces; lining membrane of bronchial tubes healthy.

Abdomen.—Intestines pale, matter contained in them of a bright-yellow colour.

Case 400.—Aged 6 months; anæmia, cough observed two days previous to admission; death occurred ten days after.

Head.—Lateral ventricles contained about 3 drachms of clear fluid.

Chest.—Lobular pneumonia in lower lobes of both lungs, most extensive in the right; weight, 4 ounces; left, 3 ounces and 2 drachms.

Abdomen.—Liver large and fatty.*

Case 401.—Aged 6 months, anæmia; weight of child, 8½ lbs; height, 24 inches; died 8 days after admission.

Head.—Brain normal.

Chest.—Vesicular pneumonia in a portion of the lower lobe of left lung. The smaller divisions of the bronchial tubes in both lungs contained muco-purulent matter; redness of bronchial lining membrane; weight of right lung, 2½ ounces; left, 2½ ounces.

Abdomen.—Mesenteric glands enlarged.

Case 402.—Aged 7 months; lobular pneumonia and emphysema; cough, dyspnoea and violent vomiting on admission; crepitation lower portions of lung; sound clear of upper; child blanched. Two days before admission 4 leeches had been applied to chest, from which there was considerable bleeding. Death occurred the day after admission.

Head.—Brain healthy.

Chest.—Pleuro-pneumonia posterior portion of lower lobe right lung. Part of the root of left lung also hepatized second stage. The remainder of both lungs pale and emphysematous. Right lung weighed 2½ ounces 1 drachm; left, 2 ounces. Heart. Auricles distended with coagulated blood.

Abdomen.—Intestines pale, mucous membrane healthy; kidneys congested.

Case 403.—Aged 12 months, anæmia; vesicular pneumonia; cough very slight; breathing but little affected; died 10 days after admission.

Head.—Brain healthy.

Chest.—Pneumonia in lower lobes of both lungs; the left had more of a granular appearance than the right, when divided, matter like pus was pressed out in considerable quantities. The bronchial tubes were blocked up, and the matter was secreted from the bronchial membrane; upper lobes of lungs emphysematous; right weighed 1½ ounce; left, 1½ ounce.

* See Mr Gulliver's paper on Fatty Degenerations, read at the Royal Medico-Chirurgical Society, February 28, 1843, and to be published in the next volume of the Society's Transactions.

Abdomen.—Organs healthy.

Case 404.—Aged 17 months. Not a patient in infirmary; no history of case; pneumonia of both lungs, (two varieties,) combined with bronchitis.

Head.—Brain healthy.

Chest.—Thymus nearly concealed the pericardium; weight, 3 drachms; pneumonia of nearly the entire lower lobe; right lung red and firm, part sunk in water; vesicular pneumonia in edges of the lower lobe left lung; yellowish matter in smaller divisions of bronchial tubes, and redness of the lining membrane; right, 3 ounces; left, 1½ ounce 2 drachms.

Abdomen.—Organs healthy.

Case 405.—Aged 2 years. Died 33 days after admission.

Head.—Brain healthy.

Chest.—Slight pleuritic adhesions on right, more extensive on left side; a portion of lower lobe right lung in first stage pneumonia; lower lobe left lung in second stage pneumonia; firm under pressure; right, 4 ounces; left, 4½ ounces.

Abdomen.—Spleen large, adherent to omentum and peritonæum; weight, 2 ounces; intestines pale.

Case 406.—Aged 4 years, anæmia; curvature of the spine; caries of dorsal vertebræ, and crest of the ilium on the right side, which was denuded of cartilage, and of a dark colour. Died 7 weeks after admission.

Head.—Fluid between convolutions of brain, and about half an ounce in lateral ventricles.

Chest.—Lobular pneumonia in lower lobe left lung; a small portion of under surface right lung firmly adherent to the diaphragm; the lower edge of lower lobe in first stage pneumonia; right, 2 ounces and 1 drachm; left lung, 3 ounces and 1 drachm.

Abdomen.—Slight peritoneal adhesions to liver; structure around diseased bone thickened and hardened; firm adhesions between this and the intestines, which were healthy; no scrofulous matter; mesenteric glands enlarged; right kidney wasted, pressed on by diseased structure; weight, ½ ounce 1 drachm; left, 1½ ounce; a fistulous opening in the right groin communicating with crest of ilium.

Case 407.—Aged 42 years. Pleuro-pneumonia and bronchitis; not a patient in infirmary; chronic cough; delirium for two or three days before death.

Head.—Congestion of brain.

Chest.—Old pleuritic adhesions on both sides; pleuro-pneumonia right lung; recent lymph on surface lower lobe; both the lower and middle lobe in third stage pneumonia; sunk in water; redness of the bronchial lining membrane of both lungs; right, 38½ ounces; left, 16½ ounces. Heart enlarged, 11 ounces.

Abdomen.—Liver large, 58 ounces; kidneys large, 13½ ounces.

Case 408.—Aged 46 years. Pneumonia combined with enlarged heart; charwoman, single; cough with occasional hæmoptysis 14 months previous to admission; pallid and emaciated; pulse 108; died nine weeks after admission.

Head.—Brain pale.

Chest.—No pleuritic adhesions; lower lobes of both lungs hepatized, red and firm; emphysema of upper lobes; cicatrices in their apices, and small earthy deposits found in them; right weighed 32½ ounces; left, 29 ounces. Heart enlarged, 14 ounces.

Abdomen.—Liver large, fatty, weight, 55 ounces; kidneys pale, mottled on surface, capsules easily peeled off; weight, 11 ounces; albumen found in urine; two ulcers on stomach at pyloric valves, each size of a silver 4d.

Case 409.—Aged 48 years. Pleuro-pneumonia combined with bronchitis and *hydrops pericardii*. Previous to admission she suffered from

pains in the bowels, which continued for four days; afterwards a lasting pain in left side; the side dull on percussion. Death occurred seven hours after admission.

Head.—Brain healthy.

Chest.—Lower lobe, and one-half the upper of left lung in an advanced stage of pneumonia, sunk in water; recent lymph on affected portion of upper lobe; redness and thickening of bronchial lining membrane in both lungs; right, 22 ounces; left, 41½ ounces; pericardium contained about 5 ounces fluid. Heart enlarged, 11 ounces.

Abdomen.—Liver large, 59 ounces; kidneys, 10 ounces; intestines healthy.

Case 410.—Aged 60. Pneumonia and bronchitis; not a patient in infirmary; no history of case.

Head.—Veins congested.

Chest.—Lower lobe right lung red, and structure soft; redness of bronchial lining membrane of both lungs; muco-purulent matter in considerable quantity in bronchial tubes; anterior thin edge of lungs in an emphysematous state; right, 24 ounces; left, 11 ounces.

Abdomen.—Organs healthy.

Case 411.—Aged 63. Double pneumonia and bronchitis, combined with serous effusion in brain and typhus fever. A nurse for four years in a London hospital. Ill two weeks previous to admission, and died eight days after.

Case 411.—Countenance flushed; skin hot and dry; tongue dry, covered with dark sordes; slight cough; delirium came on second day after admission, and continued till death.

Head.—Lateral ventricles contained about two ounces clear fluid.

Chest.—Lower lobes both lungs sunk in water, of a dark purple colour; structure soft; reddish fluid easily pressed from cut surfaces; lining membrane of bronchial tubes red; right lung, 35 ounces; left, 32 ounces. Heart large, 11½ ounces.

Abdomen.—Slight congestion mucous membrane cæcum. Liver large, 51 ounces; kidneys 10½ ounces. The nurse, in whose ward this patient was, died of typhus soon after; she attributed her illness to attendance on this case.

Case 412.—Aged 64 years. Pneumonia right lung; anasarca of lower extremities, and ulcers on both legs; urine scanty, dark-coloured; excessive heat of body for two days before death. She died four days after admission.

Head.—About a quarter of an ounce of clear fluid in the lateral ventricles.

Chest.—Right lung in second stage pneumonia; weight, 43½ ounces; left, 16 ounces. Heart enlarged; endocardium of auricles opaque; weight, 14½ ounces. Fibrine in the heart, aorta, and iliacs, also in the iliac veins.

Abdomen.—Liver large, fatty, 79 ounces; kidneys large, congested, 12 ounces.

Case 413.—Aged 66 years. Subject to asthma for many years. She died in the chronic ward work-house.

Head.—Brain healthy.

Chest.—Firm pleuritic adhesions between lower lobe right lung and diaphragm; lower lobe red, and structure softened; posterior portion of upper lobe firm, in second stage pneumonia; left lung wasted; bronchial tubes in both lungs appeared dilated, containing much viscid yellowish matter; mucous membrane of the natural colour; emphysema of edges and upper lobes lungs; right lung weighed 22 ounces; left, 12 ounces.

Abdomen.—Organs somewhat below the standard weight; intestines healthy.

Case 414.—Aged 75 years. Pneumonia left lung, combined with bron-

chitis and emphysema; an old asthmatic patient, much debilitated: died in workhouse; no urgent symptoms; sunk gradually.

Head.—About $1\frac{1}{4}$ ounce clear fluid in lateral ventricles.

Chest.—No pleuritic adhesions; emphysema upper lobes both lungs and bronchial mucous membrane red and thickened; lower lobe left lung red and firm; right, 8 ounces; left, $12\frac{1}{2}$ ounces; osseous deposits in arteries. Heart large, 10 ounces.

Abdomen.—Small liver, $37\frac{1}{2}$ ounces; kidneys 9, spleen, $5\frac{1}{2}$ ounces; mucous membrane, intestines healthy.

Case 415.—Aged 79 years. Pleuro-pneumonia left lung, and emphysema; not a patient in infirmary; no history of case.

Head.—Brain natural.

Chest.—Upper lobe left lung in third stage pneumonia; structure soft; gray colour; lower lobe same lung in first stage, red; some recent lymph on surface upper lobe, and between it and lower lobe; emphysema of upper lobe right lung; weight, 14 ounces; left, $33\frac{1}{2}$ ounces. Heart large, $10\frac{1}{2}$ ounces.

Abdomen.—Organs healthy.

Case 416.—Aged 95 years. Chronic pneumonia and chronic bronchitis; died in a chronic ward of work-house apparently from old age.

Head.—Convolutions much wasted; about 4 ounces clear fluid on surface; tested with litmus, neither acid or alkaline; albumen deposited from it both by heat and nitric acid.

Chest.—Old pleuritic adhesions posteriorly; lungs wasted; lower lobe right lung, texture soft, broke down under slight pressure; bronchial tubes appeared dilated, and contained muco-purulent secretion; right, 17 ounces; left, 9 ounces. Heart, pericardium attached along right side by three points, of a strong semitransparent false membrane.

Abdomen.—Liver small, $31\frac{1}{4}$ ounces; kidneys small, 5 ounces; aorta contained a clot of adherent fibrine; mucous membrane, intestines healthy; cysts containing fluid attached to ovaries, largest, size of a pigeon's egg; no peritoneal attachments.

TABLE II.—PNEUMONIA, (MALES) continued.

Case 417.—Aged 4 months. Lobular pneumonia combined with enlarged mesenteric glands and general wasting; died in nursery.

Head.—Brain healthy.

Chest.—Carnification of diseased portions of lungs, the size of a pigeon's at the apex of right lung, red and firm; lower lobe left lung in a similar state; right weighed 1 ounce 2 drachms; left, $1\frac{1}{4}$ ounce.

Abdomen.—Several of the mesenteric glands of a pink colour and enlarged.

Case 418.—Aged 5 months. Vesicular pneumonia combined with bronchitis; cough, shortness of breath, and dyspnoea; died two days after admission; child large, and previously in good health.

Head.—Brain natural.

Chest.—Vesicular pneumonia in lower lobes, both lungs, and the anterior thin prolongation of middle lobe, right; a portion, size of a shilling, in apex of right, studded with what appeared to be tubercles; purulent-looking matter in bronchial tubes; right, $2\frac{1}{4}$ ounces; left, 2 ounces.

Abdomen.—Organs natural.

Case 419.—Aged 18 months. Lobular pneumonia and pleuritic adhesions left side; not a patient in infirmary; no history.

Head.—Brain healthy.

Chest.—Slight pleuritic adhesions on left side of some standing; lobular pneumonia in portions of lower lobes of both lungs, and middle lobe of right; ecchymosis in specks size of a split-pea; beneath pleura in several places

on surface of diseased portions of lungs ; right weighed $3\frac{1}{2}$ ounces 2 drachms ; left, $3\frac{1}{2}$ ounces.

Abdomen.—Organs natural ; intestines pale.

Case 420.—Aged 3 years. Pneumonia combined with diarrhœa, &c. child wasted ; no cough or distress in breathing ; died five days after admission.

Head.—Brain healthy.

Chest.—Lower lobes both lungs and posterior portion of upper lobe, left, in first stage of pneumonia. The anterior thin edge of left lung had a granular feel ; (vesicular pneumonia ;) no tubercles observed ; lining membrane of the smaller bronchial tubes in the diseased portion of lung of a red colour ; right weighed $5\frac{1}{2}$ ounces ; left, 6 ounces.

Abdomen.—Liver large, greased paper when dried slowly near the fire ; weight, 20 $\frac{1}{2}$ ounces ; mucous membrane of intestines healthy ; feces light-coloured, very offensive odour ; mesenteric glands enlarged.

Case 421.—Aged 28 years. Double pneumonia, combined with pleuritic effusion ; congestion of brain ; delirium ; fever ; two days before admission he had a fit, for which he was bled, cupped, and blistered. He was in rather a low state when admitted to infirmary ; his tongue was brown, covered with fur and swollen, from having been bitten during the fit. The second day after admission his breathing became difficult, a short cough came on, and delirium at intervals, and petechiæ were observed on the body. Death occurred four days after admission.

Head.—Sinuses and veins on surface ; brain distended ; substance of brain pale and firm ; lateral ventricles small, containing very little fluid.

Chest.—No pleuritic adhesions ; about 5 ounces fluid in right, and two in left pleura ; pneumonia of upper lobes both lungs, and middle lobe of right, of a dark-red colour ; structure soft. The upper portions of lower lobes were also affected slightly ; right weighed 30 ounces ; left, 34 ounces. Heart enlarged ; left ventricle very much thickened, auricles filled with fibrine ; weight, 15 ounces ; aorta small that it did not appear larger than that of a child at 12 years.

Abdomen.—Liver greatly enlarged, 83 ounces ; kidneys, 12 ounces ; spleen, 8 $\frac{1}{2}$ ounces ; stomach, 7 $\frac{1}{2}$ ounces.

Case 422.—Aged 36 years. Shoemaker, married. Pneumonia of both lungs, combined with convulsions ; attempted to commit suicide two years previous to his admission, since which time he has been melancholy, almost bordering on idiocy. Shortly before admission, he was seized with violent convulsions ; stertorous breathing ; frothing at mouth ; mouth drawn to right side ; pupils contracted ; the convulsions continued for six or eight hours. Died two days after admission.

Head.—Vessels of brain congested ; no opacity of arachnoid, or any organic disease detected.

Chest.—Pneumonia of lower lobes of both lungs, and posterior portion of upper lobe of right. A considerable quantity of red fluid was pressed from cut surfaces ; right weighed 30 ounces ; left, 25 ounces.

Abdomen.—Liver extended across to left side, where it was united to spleen ; liver weighed 46 ounces ; spleen, 5 ounces.

Case 423.—Aged 38 years ; a soldier. Typhus fever, terminating in pneumonia ; ophthalmia of right eye ; sight of left one lost in the West Indies from disease. Died four weeks after admission.

Head.—Congestion of substance of brain.

Chest.—Firm pleuritic adhesions on right side ; right lung entirely solid, sunk in water ; weight, 87 ounces ; left, 14 ounces ; heart large, 11 $\frac{1}{2}$ ounces ; foramen ovale sufficiently open to admit a quill pen.

Abdomen.—Liver large, 66 $\frac{1}{2}$ ounces ; kidneys large, congested, 12 $\frac{1}{2}$ ounces ; spleen, 6 $\frac{1}{2}$ ounces.

Case 424.—Aged 45 years. Pneumonia of both lungs in a man long con-

fined to bed from apoplexy and paralysis. The apoplectic fit occurred two weeks before his admission, and was attended with loss of speech and hemiplegia of right side. He recovered the power of speech, and the use of his limbs were partially restored; his mind in a childish state all the time; bowels costive; subject to flushings and convulsions at intervals of four or five weeks. Death occurred fifteen weeks after admission.

Head.—Congestion of surface of brain; an oval hole three or four lines long diameter, in left *corpus striatum*; some smaller cavities in the surrounding portion of brain; a portion of the brain behind the left optic thalamus unusually firm.

Chest.—Old pleuritic adhesions to apex of left lung; pneumonia in third stage in the lower lobes of both lungs; weight together, 55 ounces; heart, 9½ ounces.

Abdomen.—Liver weighed 5½ ounces; spleen, 7 ounces.

Case 425.—Aged 46 years. Double pneumonia, combined with bronchitis; a large ulcer on right leg. Died five days after admission. Illness accompanied with typhoid fever.

Head.—Brain natural.

Chest.—Pneumonia; lower lobes both lungs dark-coloured, apparently in first stage; bronchial tubes filled with a viscid matter of a brownish-red colour; their lining membrane red, and appeared thickened; right weighed 26 ounces; left, 27½ ounces.

Abdomen.—Liver large, inclining to a waxy state; weight, 52½ ounces; mucous membrane, intestines healthy.

Case 426.—Aged 50 years. Double pneumonia; attended out of doors for three days before death. A large muscular man.

Head.—Brain healthy.

Chest.—No pleuritic adhesions; posterior portion and lower lobe right lung in third stage pneumonia; structure soft; granular appearance when divided; sunk in water; lower lobe left lung dark-coloured; structure firm; not so far advanced in disease as the other; a portion sunk in water; redness of lining membrane bronchial tubes; right, 57 ounces; left, 38 ounces; heart large, 13½ ounces; yellow fibrine in auricles.

Abdomen.—Liver large, 73½ ounces; kidneys, 13½ ounces; intestines healthy.

Case 427.—Aged 51 years. Pneumonia left lung, in a man for some months confined to bed, from sloughing and gangrene of right thigh and left leg. He died eighteen days after admission.

Head.—Brain natural.

Chest.—Strong pleuritic adhesions on both sides; congestion of the lower lobe right lung; the lower lobe and posterior portion of upper lobe of left lung in second stage pneumonia; right weighed 16 ounces; left, 34 ounces; heart, 10 ounces.

Abdomen.—Liver large, 65 ounces; spleen enlarged, 12½ ounces; cysts containing straw-coloured fluid in right kidney.

Case 428.—Aged 53 years.—Pneumonia, complicated with pericarditis; not being a patient in Infirmary there was no history.

Head.—Brain healthy.

Chest.—Old pleuritic adhesions on right side; pleura on lung thickened; pneumonia in second stage in lower lobe right lung; right, 35 ounces; left, 21 ounces; heart enlarged; old adhesions to pericardium; weight, 13½ ounces.

Abdomen.—Liver large, congested; weight, 80 ounces; kidneys congested, 11 ounces; spleen large, 10 ounces; mucous membrane of intestines healthy.

Case 429.—Aged 64 years. A labourer. Cough and dyspnoea for three weeks previous to admission, complicated with typhus fever. Died nine days after admission.

Head.—About half an ounce of clear fluid in the lateral ventricles of brain.

Chest.—Pneumonia of almost the whole of right lung, part in second and part in third stage ; a portion of lower lobe and posterior portion of upper lobe left lung in first stage pneumonia ; right lung weighed 53 ounces ; left, 29½ ounces ; heart enlarged ; auricles contained fibrine ; warty excrescences of fibrine adhering to semilunar valves of the aorta ; weight 13½ ounces.

Abdomen.—Liver large, 54 ounces ; spleen also enlarged, 16 ounces ; kidneys, 11½ ounces ; intestines healthy.

Case 430.—Aged 64 years ; painter. Pneumonia, combined with bronchitis and congestion of the brain. In a delirious state when admitted ; this continued till shortly before death ; ulcers of very long standing on legs, which were nearly healed ; chronic cough for several winters. Died two days after admission.

Head.—Both surface and substance of brain much congested.

Chest.—Old pleuritic adhesions on right side ; none on left side ; lower lobe and posterior portion of upper of right lung very dark-coloured and firm ; the upper portion firmer than the lower ; part sunk in water ; congestion and first stage pneumonia in lower lobe left lung ; frothy fluid matter in bronchial tubes, and redness of their lining membrane ; right weighed 35½ ounces ; left, 31 ounces ; heart, endocardium in auricles opaque, thickened ; weight, 11½ ounces.

Abdomen.—Kidneys small, firm ; a cyst in one of them size of a filbert filled with fluid ; kidneys weighed, 6 ounces ; some congestion in mucous membrane great intestines : that lining cæcum and upper portion of colon of a dark-green colour.

Case 431.—Aged 70 years. Formerly in the Life Guards ; in the habit of frequently taking long walks ; did so till very recently ; *gangrena senilis* affecting all the toes of left foot except the little one. The disease was attended with delirium at night for the last three or four weeks, and terminated in double pneumonia seven weeks and two days after his admission.

Head.—Congestion of brain ; absorption of the convolutions ; fluid between the convolutions and membranes of brain.

Chest.—Lower lobe right lung in second stage pneumonia ; lower lobe and posterior portion of upper lobe left lung in first stage pneumonia ; a thin layer of lymph covering about one-fourth of upper lobe ; right, 22 ounces ; left, 31½ ounces.

Abdomen.—Organs natural ; osseous deposits in aorta and iliacs.

Case 432.—Aged 74 years. Pleuro-pneumonia, combined with pulmonary tubercles and chronic arachnitis. Died five weeks after admission. Hemiplegia of left side on admission ; had a fit the day previous.

Head.—Thickening of arachnoid membrane ; traces of old apoplexy.

Chest.—Pleuritic adhesions on both sides, most on right ; tubercles in upper lobes both lungs ; about 3 ounces fluid in left pleura ; some recent lymph on lower lobe, which was in the second stage of pneumonia ; weight of lungs together, 48 ounces ; heart, 9½ ounces.

Abdomen.—Stomach weighed 8½ ounces ; kidneys, 10½ ounces ; other organs natural.

Case 433.—Aged 81 years ; a street sweeper. Gangrene of the great toe of right foot ; dyspnoea and purulent expectoration ; pneumonia of right lung. He died two weeks after admission.

Head.—Congestion of brain.

Chest.—Old pleuritic adhesion on right ; none on left side ; a large portion of right lung in third stage pneumonia ; general redness of the lining membrane of bronchial tubes in both lungs ; right, 38 ounces ; left, 19½ ounces. Heart enlarged ; endocardium unusually opaque ; weight, 13½ ounces.

Abdomen.—Liver soft, brownish colour, 63½ ounces; kidneys (horse-shoe); their substance joined on the spine; small calculi and red and yellow particles in pelvis of each; kidneys weighed 9½ ounces; vide Mr Guliver's notes, p. 162, on "yellow matter" in the case of a child; coats of the right femoral artery appeared thickened; lining membrane rough; vessel blocked up with coagulated blood.

Case 434.—Aged 86 years; for many years in workhouse. Pneumonia combined with chronic asthma.

Head.—Brain natural.

Chest.—Old pleuritic adhesions on both sides, most extensive on the right, and pneumonia of lower lobe and posterior portion of upper of right; lower lobe of a red colour; upper lobe much darker in colour in one part, which gradually shaded off to a much lighter colour; this portion infiltrated with fluid, which flowed from divided surface on slight pressure; pneumonia also affected a portion of the lower lobe of left lung; bronchial lining membrane red, and appeared thickened; right weighed 44 ounces; left, 30 ounces; heart large, 13 ounces.

Abdomen.—Liver large, fatty; weight, 57 ounces; gall-bladder filled with pale-coloured calculi, composed of nearly pure cholesterine, size of a French bean; some were dissolved, and deposited crystals of cholesterine on cooling.

Table 2 in the preceding communication contained 154 cases of pneumonia; to these 36 are now added, which complete the whole number examined during three years, and make the total 190.

Eighteen of the 36 cases occurred in females, 7 of them above 60 years, 3 middle aged, and 8 children; the remaining 18 in males, 6 above 60 years, 8 adults below that age, and 4 children.

Seat of Pneumonia.—In the 12 infantile cases the lower lobes of both lungs were more or less affected; in the adult and old females the lower lobes of both lungs in 2 cases; lower lobe of right lung in 5; lower lobe of left in 2; and upper lobe of left in 1. In the male adults the lower lobe of both lungs in 8; the upper lobes of both in 1; lower lobe of right in 3; and lower lobe of left in 2.

Taking the whole of the 100 cases in children, "double pneumonia" existed in 77, principally affecting the lower lobes; upper lobes of both lungs only in 1; right lung only was affected in 11; left lung only in 9; upper lobe of one lung, and lower lobe of opposite in 2. The seat of the disease presented no difference worthy of notice between the male and female children. Where the lower lobes of both lungs were affected, the right was usually the one in which the greatest amount of disease existed, as will be seen in the majority of cases recorded by comparing the weight of each lung. In no disease, perhaps, is the system of weighing of more value, as it enables us to form a more accurate knowledge of its extent than we can do by any other means. *

* From one to four drachms should be allowed in the right lung, according to the age of the child, as it naturally exceeds the left in weight by so much.

Varieties of Pneumonia.—An example of what has been called “carnification,” occurred in the youngest of the male infants; the upper lobe of the right, and lower lobe of the left lung were the parts so affected; among the preceding cases, other examples have occurred of induration or carnification in children of more advanced age. This state is very similar to the condition of the lungs in dead-born children. Portions of the lungs also of feeble infants who have lived only for a short time are not unfrequently found in a like state, most probably from the air never having thoroughly penetrated those organs in them. In newly born children the upper lobe of the right lung is generally more distended than any other portion, and the right lung is altogether fuller and larger than the left.

Indurated, depressed, and red portions of lung were sometimes seen in the lobular, and other forms of pneumonia. If situated about the centre of a lobe, these were sometimes surrounded on all sides by the pale, healthy, and more elevated portions. The middle lobe of the right lung has been found in an indurated state, and sometimes had a feel like leather.

Carnification or induration appears to be the chronic pneumonia of children, analogous to induration, or what has been termed “chronic pneumonia” in adults. Lobular pneumonia has been the most frequent variety in children. Vesicular pneumonia, combined with bronchitis, and sometimes enlargements of mesenteric glands, was common in very young and delicate infants. The lungs in many such cases were of a pale or gray-colour, and had a granular feel, very similar to the feel of a tuberculous lung. These firm granules were most commonly observed in the thin portion of the lung. When divided, a drop of puriform matter oozed out, and a central depression, the opening of the small bronchial tubes, was seen.

When the disease was extensive, an entire lobe, or more of the lungs being implicated, the pleura was usually coated with lymph.

These varieties often co-existed, and seemed to be more properly different degrees or stages of the same disease, than varieties. For example, the whole of one lung, or nearly so, has been affected, and a lobule of the other lung; the lower lobe of a lung, and a lobule in the upper lobe of the same lung, and *vice versa*. Vesicular pneumonia has been found in the thin portion of the lung combined with bronchitis, and seemed sometimes to be a forerunner of the other varieties.

In comparing the remaining cases of the 90 adults and old persons of both sexes, 48 males and 47 females, it was found that double pneumonia existed in 16, or upwards of one-third the males, being the most frequent in that class, while it was found only in 11, or less than one-fourth the females. It was confined to the upper lobes of both lungs in three males and in two

females. The right lung only was the situation of the disease in 15 males and in 20 females, being the most frequent in the latter sex; the left lung only was affected in 12 males and in nine females. Upper lobe of right lung only in three females; upper lobe of left only in three females; upper lobe of left lung and lower lobe of right in one female. No example of the three last situations of the disease occurred among the males; therefore the females have presented the greatest variety in situation.

In the aged and bed-ridden, the dependent portions, the lower lobes and posterior portions of upper, were the usual seat of the disease.

What has already been stated with respect to the weight of the lungs in children who have died from pneumonia, is equally applicable in the great majority of cases in adults, in whom the weight of the lung was often found double and sometimes more than quadruple the natural weight, *vide* Case 423. The right lung is about one ounce heavier than the left in the healthy state.

Among adults, pneumonia presented various appearances; the colour was often very dark, almost black in some, of different shades of brown, purple, red, yellow, to a light fawn-colour in others. The structure was sometimes soft, almost pulpy in several of the dark-coloured forms. A granular appearance co-existed with a certain degree of consolidation, but it was not observed very frequently. The fawn-colour accompanied an unusually firm state of the lung. In the aged, the lungs, in common with other organs, were wasted; their edges thin, semitransparent, often emphysematous, of a pale fawn colour, interspersed with black matter;* the bronchial tubes very firm and elastic, and appeared to be dilated, which, in part, may be owing to the wasting of the surrounding tissues; the muscular fibres were very distinct. Where no pleuritic adhesions existed anteriorly, the lungs were found to occupy but a small space comparatively; on either side the spine. Pneumonia in the old seemed in some cases to be a mere engorgement, which, having occurred in a naturally flaccid lung, a large quantity of a dark-reddish fluid could be pressed out. Sometimes the structure was in a pulpy state.

When pneumonia occurred in an emphysematous lung, there was oedema of the surrounding parts. A large quantity of a dark-coloured spumous fluid could readily be pressed from the cut surfaces in the lower portions of the lung, the colour of the fluid gradually becoming lighter towards the upper part. In some cases the upper lobes were comparatively free, and the lower lobes firmly connected to the parietes by old pleuritic adhesions, often torn in the attempt at removal, while the upper lobes possessed their usual tenacity.

* *Vide* Case 490, Dr Davy's Chemical Observations in Mr Gulliver's notes.

In cases of induration or chronic pneumonia of a portion of the lung, the parts around were often infiltrated with a slightly discoloured frothy fluid, which could readily be pressed out, the dark colouring matter being apparently deposited in the solidified portion of lung.

The disease had, in most of the cases examined, arrived at its second and third stages.

TABLE A.—Showing the age and sex of 190 cases of Pneumonia examined during three years, 1840–42, both inclusive.

Age.	M.	F.	Age.	M.	F.
Under 6 months,	9	16	From 15 to 20 years,	0	0
From 6 to 12, .	9	19	20 to 30, do.	3	2
1 to 2 years,	12	11	30 to 40, .	3	3
2 to 3 do.	2	4	40 to 50, .	4	4
3 to 4, .	2	4	50 to 60, .	5	4
4 to 5, .	1	2	60 to 70, .	10	13
5 to 6, .	0	1	70 to 80, .	11	13
6 to 7, .	3	2	80 to 90, .	5	7
7 to 10, .	0	1	90 to 99, .	2	1
10 to 15, .	1	1			
Total children,	39	61		43	47

Thus, at the early, and also at the late periods of life, pneumonia appears to have been most fatal; in the former, from the eruptive fevers, and whooping-cough, so frequently having terminated in this disease; and in the latter, from the bedridden persons and old asthmatics having been so often cut off by it. Nearly one-half have died in the first five periods under four years, and a very large proportion of the remainder, in the last five periods, after fifty years, according to the above table.

As regards *sex*, the females much exceeded the males, especially in the first periods during infancy, there were 108 females and only 82 males. The reverse has been the case in phthisis, the only disease that was so fatal, the males having exceeded the females considerably. The numbers from all diseases of each sex examined within the three years were very nearly equal.

Symptoms, among the children especially, were sometimes very obscure. A pallid child lying quietly in bed, without cough or other marked symptom of the disease—its breathing was observed suddenly to become short, and oppressed, or even without dyspnoea, it died suddenly. In such an instance, nearly the entire of one lung has been found in an advanced stage of pneumonia, the pleura coated with lymph, and a portion of the opposite lung also affected.

Convulsions have sometimes accompanied the disease, and in infants a few months old, have not unfrequently been the immediate forerunners of death. This has been remarked in cases complicated with the eruptive fevers.

In the severe epidemics of measles and scarlatina, where the children outlived the virulence of the disease at the outset, pneumonia has almost invariably afterwards been the cause of the fatal termination. Hence, it may be observed, that pneumonia must be more or less influenced by those diseases which commonly terminate in it, as also by other causes, depending on seasons and different years, the "epidemic constitution."

The mortality in this establishment among children was less in the year 1840, than in either of the succeeding years; it appears, too, the mortality from pneumonia was also less:

Numbers in 1840, males, 20	females, 31	total, 51
1841, 33	36	69
1842, 29	41	70

TABLE B. Showing the numbers of males and females in each month during the three years, 1840-42, both inclusive.

Months.	Years.	M.	F.	Months.	Years.	M.	F.
January,	1840,	0	2	July,	1840,	1	1
	1841,	8	5		1841,	0	1
	1842,	6	5		1842,	1	1
	Total,	14	12		Total,	2	3
February,	1840,	0	3	August,	1840,	3	2
	1841,	4	6		1841,	0	2
	1842,	4	6		1842,	0	2
	Total,	8	15		Total,	3	6
March,	1840,	2	1	September,	1840,	3	2
	1841,	3	1		1841,	0	1
	1842,	3	6		1842,	0	0
	Total,	8	8		Total,	3	3
April,	1840,	1	2	October,	1840,	2	3
	1841,	4	2		1841,	4	4
	1842,	3	6		1842,	3	2
	Total,	8	10		Total,	9	9
May,	1840,	1	2	November,	1840,	4	5
	1841,	2	1		1841,	2	6
	1842,	2	2		1842,	1	2
	Total,	5	5		Total,	7	13
June,	1840,	1	5	December,	1840,	2	3
	1841,	1	2		1841,	5	5
	1842,	0	0		1842,	6	7
	Total,	2	7		Total,	13	15

As might be anticipated, the greatest mortality occurred during the cold *season*, commencing in October, and ending in April; at this season, too, the eruptive fevers have most prevailed. In the winter quarter 34 males and 42 females were examined; in

the spring quarter, 24 males and 33 females; in the summer, 9 males and 15 females; in the autumn, 15 males and 18 females.

A marked difference thus existed between the different quarters; the largest number examined was in the winter, and the smallest in the summer. Taking the year 1840, however, the case is different, as both the second and fourth quarters in that year exceed the first. More sickness existed among the poor in this establishment, during the second quarter than during the first quarter of that year; as may be seen by referring to the table of diseases already published in the Edinburgh Medical and Surgical Journal, No. 151.

GANGRENE OF THE LUNGS, (11 Cases.)

Case 435.—Complicated with pulmonary tubercles, hydrothorax, and diarrhoea; a coal-heaver, single, aged 24 years. Died fourteen weeks after admission.

Head.—Arachnoid opaque, thickened; some fluid between it and the convolutions; ventricles also contained more fluid than in health.

Chest.—Right pleura contained a large quantity of dark-coloured fluid; upper lobe of right lung in a gangrenous state; the slough bounded by some soft whitish matter about a quarter of an inch in thickness; tubercles existed in the middle portion of the lung; left lung very large, somewhat congested; mucous membrane of bronchial tubes red and thickened; right weighed 12½ ounces; left, 20 ounces; heart small, 7 ounces.

Abdomen.—Liver large, 57 ounces; spleen, 7 ounces; kidneys, 10 ounces; mucous membrane large; intestines softened, and surface covered with dark carbonaceous matter. Vide Mr Gulliver's notes, under "black pigment" in the intestinal mucous membrane.

Case 436.—Gangrene of left lung. A coachman, married, aged 46 years. Admitted with pains affecting the limbs, and also the epigastrium; in a low typhoid state; no cough or any complaint of the chest. Shortly before his death, there was a heavy sickening odour from his breath. According to the statement of his wife, he was an habitual drunkard, taking very little solid food, living for months together on gin. Died eleven days after admission.

Head.—Brain natural.

Chest.—A greenish-coloured slough, having an offensive odour, two inches and a-half long, by one broad, on posterior portion of left lung; two small gray sloughs on posterior portion lower lobe right lung, bounded by lymph on surface; lungs together weighed 29 ounces; heart large, 12 ounces.

Abdomen.—Organs natural.

Case 437.—Gangrene and pneumonia of left lung, complicated with psoas abscess and Bright's disease of kidneys. Charles M., aged 61 years. Attended at his miserable lodging by Mr Whitwell; in an extremely low state when first visited. He declined coming into the Infirmary.

Head.—Brain pale.

Chest.—Old pleuritic adhesions; œdema of lower lobe of left lung, three-fourths of it softened; in centre of softened portion a gangrenous cavity size of a hen's egg, from which fetid air escaped; it contained shreds of disorganized lung. The branches of the pulmonary vessels which traversed the cavity were filled with coagulated blood, of a bright-red colour; right lung weighed 16½ ounces; left, 36½ ounces.

Abdomen.—Liver large, yellow, and fatty; weight, 64 ounces; right

kidney enlarged; capsules thickened; about half-a-pint of purulent matter was found between kidney and psoas muscle, extending as low down as the femoral ring; pelvis of kidney dilated, structure pale; left kidney also pale, smaller than right; no distinction observable between tubular and cortical portions; seemed to be in an advanced stage of Bright's disease; right kidney weighed $7\frac{1}{2}$ ounces; left, $4\frac{1}{2}$ ounces; bladder distended; muscular coat thickened; mucous membrane of intestines in a healthy condition.

Case 438.—Gangrene and pneumonia of left lung. A butcher, single, aged 65 years. Died four weeks after admission; for three weeks before death, his breath had a most offensive odour, previous to which there was almost constant vomiting; organic disease of the stomach was at first suspected.

Head.—Arachnoid and *pia mater* rather more than usually adherent to the convolutions of the brain.

Chest.—Congestion of the lower lobe right lung; upper lobe left lung in an advanced stage of pneumonia; an excavation, four inches long by two broad, at its posterior part, containing a slough like dead cellular tissue; right, 24 ounces; left, 35 ounces; heart, $9\frac{1}{2}$ ounces.

Abdomen.—Organs small; liver, $38\frac{1}{2}$ ounces; kidneys, $5\frac{1}{2}$ ounces; spleen, $2\frac{1}{2}$ ounces; stomach, $3\frac{1}{2}$ ounces.

Case 439.—Gangrene and pneumonia of left lung, complicated with disease of the stomach. Thomas D., aged 74 years. Stated on admission to Infirmary, that he had a cough for one month previous; there was extensive dulness on both sides the chest, above and behind, and considerable flattening. Died forty days after admission.

Head.—Brain natural.

Chest.—Old pleuritic adhesions on both sides; upper lobe of right lung emphysematous; pericardium covered by it; some dark hard specks like tubercles in right lung; both lungs were dark-coloured, with some induration, (chronic pneumonia,) especially of the right. In the lower portion of the left lung, resting on the diaphragm, was found what appeared to be an encysted abscess, size of a pigeon's egg, containing a dark fluid; the surrounding portion of lung in a gangrenous state, quite black, and having a most offensive odour; right, 31 ounces; left, $27\frac{1}{2}$ ounces; heart small, $6\frac{1}{2}$ ounces.

Abdomen.—A tumour size of an apple, irregular on its surface, was found attached to the inner and anterior wall of the stomach, at its pyloric extremity.

Case 440.—Gangrene of right lung, and pneumonia, with bronchitis, emphysema, and pulmonary tubercles. A female, aged 34 years; had a cough for four months previous to admission, and hæmoptysis five weeks before; tremors and thirat; pulse very quick; tongue dry, coated with dark fur; the usual symptoms of low fever, which continued till her death, two weeks after admission.

Head.—Brain natural.

Chest.—Emphysema of upper lobes and anterior edges of both lungs; lobular pneumonia and congestion in upper lobe right lung; about the size of an orange of the lower portion of upper lobe in third stage of pneumonia; a spot of gangrene size of a shilling in its centre; smaller gangrenous sloughs in four or five other places, surrounded by hepatized and indurated portions of the lung; a few tubercles in apex of left lung; the portions of lung immediately surrounding them getting into a gangrenous state; general redness of the lining membrane of bronchial tubes; right lung, $24\frac{1}{2}$ ounces; left, 17 ounces; heart weighed $10\frac{1}{2}$ ounces.

Abdomen.—Liver large and soft, 68 ounces; kidneys, 13 ounces.

Case 441.—Gangrene and pulmonary apoplexy right lung, congestion

of left lung; general bronchitis. Female, aged 44 years; subject to cough and dyspnoea for the last eight years; a patient in the infirmary on several occasions; orthopnoea, bloody and purulent expectoration in large quantity on admission. She died ten days after.

Head.—Congestion of brain; structure had a red marbled appearance; ventricles contained no fluid, their parietes in contact.

Chest.—Emphysema of lungs; the size of a walnut of the posterior portion of lower lobe right lung in a state of pulmonary apoplexy, and in its centre a gangrenous spot; lower lobe and back part of upper of left lung congested; bronchial tubes of both lungs appeared dilated, and were loaded with purulent matter, the lining membrane red and thickened; right lung, 28 ounces; left, 30½ ounces. Heart enlarged, 13 ounces.

Abdomen.—Liver congested, 56 ounces; intestines healthy.

Case 442.—Gangrene of left lung; apoplexy. A charwoman, aged 46 years. She stated on her admission, that, returning home from work the day before, she was seized with giddiness and loss of power in the left side; pain in the right side of the head, convulsions came on, and lasted for two hours, after cupping, attended with frothing at the mouth and mucous rattle in the throat; mouth not drawn to either side; hemiplegia left side; pulse fuller at left than right wrist; pupils natural, light of a candle did not produce contraction. The day after admission the convulsions had entirely subsided, and the head symptoms improved. Three days before death she was feverish, without pain; breathing heavy; cough troublesome. Death occurred twelve days after admission.

Head.—A clot of blood size of a large bean in *corpus striatum* and optic thalamus right side; half-an ounce of clear fluid in the lateral ventricles.

Chest.—Pleuritic adhesions on both sides; congestion of the lower lobe of right lung; nearly the entire of the lower lobe of left lung in a gangrenous state; bronchial lining membrane in both lungs red and thickened; right weighed 17½ ounces; left, 26 ounces. Heart large, 13 ounces.

Abdomen.—Liver large, nutmeg appearance, 58½ ounces; intestines healthy.

Case 443.—Gangrene and pneumonia of the right lung. Mary W. aged 51 years; eleven days before death she applied for medical attendance at her own home. The body was brought here previous to burial. From the quantity of blood expectorated, it was set down as a case of pulmonary apoplexy in the first instance. There was profuse perspiration for three or four days before death.

Head.—Brain natural.

Chest.—Emphysema and congestion in both lungs; the middle lobe of right lung was in the second stage of pneumonia; on its posterior portion was a superficial gangrenous slough, three inches long by one broad, having an offensive odour; right lung, 32½ ounces; left, 21 ounces. Heart weighed 11½ ounces.

Abdomen.—Liver large, 53 ounces; kidneys large and soft, 17½ ounces; intestines healthy.

Case 444.—Gangrene, cancer, and pneumonia of the right lung, cancer of the bronchial glands. A laundress, aged 58 years; complained of hoarseness for two weeks previous to admission; was bled with relief before coming in for hæmoptysis; an impulse on the right side of chest, with double sound, but no marked bruit; aneurism of aorta suspected; died eleven days after admission.

Head.—Brain natural.

Chest.—Bronchial glands on right side enlarged, carcinomatous, extending beyond the apex of lung, beneath the clavicle, and surrounding the right bronchial tube, the mucous membrane of which at one point was destroyed, and generally red throughout. Some of these cancerous tumours when divided were dark-coloured internally, like the bronchial glands

themselves, in persons of this age. The largest mass of cancer was at the root of the lung, where it encroached upon the substance of the lung. There was a large ragged gangrenous cavity occupying one-third of the upper lobe, and several small gangrenous specks in other portions of the same lobe. The intervening portions of lung firm in second stage of pneumonia. Left lung healthy; weight, 15 ounces; right lung, 23 ounces. Heart, 8 ounces.

Abdomen.—Liver large, 56 ounces. Spleen, 8 ounces. Kidneys, 11 ounces; colon contracted.

Case 445.—Gangrene of both lungs, combined with pleuro-pneumonia of the right, and pulmonary apoplexy of left lung; enlarged heart. A female, aged 63 years; complained of pain between the shoulders on admission, and sense of constriction in the lower part of the chest, just above the diaphragm; incessant short cough; great dyspnoea, and bloody expectoration, which continued to the last. Two days before death her breath was extremely fetid. She died one month after admission.

Head.—Brain healthy.

Chest contained one pint of dark-coloured fluid, and flakes of lymph; on the base of the lower lobe of right lung were two gangrenous sloughs, each the size of 6d., and a quantity of lymph around them; about one-third the lower portion of lower lobe left lung was in the state termed pulmonary apoplexy; above this was a cavity, size of an orange, the walls of which were thin, and in a gangrenous state; lungs together weighed 40 ounces. Heart enlarged; weight, 13½ ounces.

Abdomen.—Organs natural.

Five of these cases have been among males,—age of the youngest one 24, that of the oldest, 74 years. Six among females,—the youngest, 34, and the oldest, 63 years.

Season.—One female was examined in March; one male in May; one male in June; one female in August; one female in September; one male and one female in October; one male and one female in November; and one male and one female in December. Number in each year: In 1840, two males and one female; in 1841, three males; and in 1842, five females.

The right lung only was affected in five cases; the left in five; and both lungs in one. In one instance the disease was complicated with tubercles; in one with cancer; in two with pulmonary apoplexy; in six with pneumonia; and in one, there was no other organic disease; the lungs were not above the average weight, but, on the contrary, considerably below it, according to the standard quoted in the beginning. Heart above the average weight in six cases, and below it in three. In the gangrenous parts examined by Mr Gulliver, "fatty globules" were found.—"Vide Notes." Four cases of *bronchitis* are here added to those already published in Table I. The female cases are thereby increased to 51, and the total to 77.

Case 446.—Female, aged 26 years. The body was brought in previous to interment, from a miserable lodging, in a court in the neighbourhood.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides, but most extensive on the right; bronchial tubes filled with muco-purulent matter, and the lining

membrane red; right lung weighed $15\frac{1}{2}$ ounces; left, 18 ounces. Heart, $8\frac{1}{2}$ ounces.

Abdomen.—Distension of the large intestines; spleen soft, $4\frac{1}{2}$ ounces; a tumour size of a hen's egg attached to each ovary.

Case 447.—Female, aged 50 years; bronchitis, emphysema, and enlarged heart; breathing difficult; face purple; surface cold, almost insensible on admission; died the day after; no previous history obtained.

Head.—Brain congested, convolutions appeared flattened; structure had a marbled appearance, when divided, from the distension of the vessels; no blood effused; no fluid in the ventricles.

Chest.—No pleuritic adhesions; general emphysema of the lungs, congestion of the right; bronchial mucous membrane red, and appeared to be thickened; right weighed $24\frac{1}{2}$ ounces; left, $16\frac{1}{2}$ ounces; cavities of heart distended with clots, weight, $11\frac{1}{2}$ ounces; attached to the pericardium externally was a hard substance like bone, size of a filbert.

Abdomen.—Organs congested; liver large, 59 ounces; mucous membrane of intestines of a deep-red colour.

Case 448.—Female, aged 65 years; bronchitis, emphysema, earthy deposits, and enlarged heart. A servant in the infirmary, for many years asthmatic, suddenly seized with orthopnea; unable to lie down for two days; dyspnoea continued, and clammy perspiration; she died six days after the attack.

Head.—Brain natural.

Chest.—Old pleuritic adhesions on both sides; congestion of the lower lobe of right lung; apex of left lung contained earthy deposits, and remains of what appeared to have been tuberculous cavities, one, filled with a thin milky fluid, was large enough to contain a French bean; edges of lungs emphysematous; bronchial tubes contained a quantity of dark viscid matter; right lung, $20\frac{1}{2}$ ounces; left, 14 ounces. Heart enlarged, its cavities distended with dark grumous blood; weight $16\frac{1}{2}$ ounces; inner surface of arch of aorta rough, from a firm white substance between its coats.

Abdomen.—Liver large, congested, 50 ounces; kidneys firm, wasted, $5\frac{1}{2}$ ounces; intestines healthy; small cysts on surface of ovaries.

Case 449.—A blind female, aged 69 years; died in a chronic ward in the work-house.

Head.—Brain appeared natural; optic nerves dark-coloured and wasted.

Chest.—No pleuritic adhesions; lungs collapsed; a quantity of dark viscid matter in the bronchial tubes; congestion, and some softening in a portion of lower lobe right lung; weight, 14 ounces; left, $9\frac{1}{2}$ ounces. Heart contained fibrine, $9\frac{1}{2}$ ounces.

Abdomen.—Liver small, $36\frac{1}{2}$ ounces; intestines healthy.

The brain was above the average weight in three out of the four cases; congested in one; more fluid than usual in the lateral ventricles in one. In addition to the special disease of the lungs in question, pleuritic adhesions existed in two; emphysema in two; and congestion of the lungs in two only of the four cases.

Heart enlarged in three, and in one to about double the average size.

Abdominal organs; liver enlarged in two, and below the average size in one case; kidneys small in one; and ovaries diseased in one of the four cases; only two of the four were patients in the infirmary; one of these died in six days, and the other in one day after admission.

The complications of the former cases of this disease, as in the present instance, were shortly summed up at the end.

Sex.—Bronchitislike pneumonia, has been most frequent among females, but in a still more marked degree, the cases being nearly twice as common as among males.

Age.—Bronchitis has rarely proved fatal before the decline of life. It has been very common among children, and in many instances has been the forerunner of that most fatal disease, pneumonia.

Sex.—The victims of bronchitis have principally been old women after 60 years of age, and as a much larger number of women than men of this class are to be found in the work-house, the greater mortality among them may, from that circumstance, be partly accounted for.

Season.—About 60 per cent. of the cases occurred in the first quarter, (January, February, and March,) and 24½ per cent. in the last quarter; there were but two cases in the third quarter of the three years combined.

The details of the above will be found in the following abstract. TABLE C, showing the age, sex, and number in each quarter of the 77 cases of bronchitis and emphysema during three years, 1840-42 inclusive.

Ages.	Years.	1st Qr.		2d Qr.		3d Qr.		4th Qr.		Total.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 2 years,	1840,	0	0	0	0	0	0	0	1	0	1
	1841,	0	0	0	0	0	0	0	0	0	0
	1842,	0	0	0	0	0	0	0	0	0	0
	Total.	0	0	0	0	0	0	0	1	0	1
From 2 to 7,	1840,	0	0	0	1	0	0	0	0	0	1
	1841,	1	1	0	0	0	0	0	0	1	1
	1842,	1	0	0	0	0	0	0	0	1	0
	Total.	2	1	0	1	0	0	0	0	2	2
7 to 15,	1840,	0	0	0	0	0	0	0	0	0	0
	1841,	0	0	0	0	0	0	0	0	0	0
	1842,	0	0	0	0	0	0	0	0	0	0
	Total.	0	0	0	0	0	0	0	0	0	0
15 to 20,	1840,	0	1	0	0	0	0	0	0	0	1
	1841,	0	0	0	0	0	0	0	0	0	0
	1842,	0	1	0	0	0	0	0	0	0	1
	Total.	0	2	0	0	0	0	0	0	0	2
20 to 30,	1840,	0	0	0	0	0	0	0	0	0	0
	1841,	0	0	0	0	0	0	0	0	0	0
	1842,	1	0	0	1	0	0	0	0	1	1
	Total.	1	0	0	1	0	0	0	0	1	1

Ages.	Years.	1st Qr.		2d Qr.		3d Qr.		4th Qr.		Total.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
From 30 to 40,	1840,	1	1	0	0	0	0	0	0	1	1
	1841,	1	0	0	0	0	0	0	0	1	0
	1842,	0	0	0	0	0	0	0	0	0	0
	Total.	2	1	0	0	0	0	0	0	2	1
40 to 50,	1840,	1	3	0	0	0	0	1	0	2	3
	1841,	0	1	0	0	0	0	1	1	1	2
	1842,	0	1	1	0	0	0	0	0	1	1
	Total.	1	5	1	0	0	0	2	1	4	6
50 to 60,	1840,	0	0	0	0	1	0	0	1	1	1
	1841,	2	2	0	0	0	0	0	0	2	2
	1842,	1	1	0	0	0	0	0	1	1	2
	Total.	3	3	0	0	1	0	0	2	4	5
60 to 70,	1840,	4	0	0	1	0	0	0	2	4	3
	1841,	1	2	0	1	0	0	0	1	1	4
	1842,	1	0	0	1	0	0	0	2	1	3
	Total.	6	2	0	3	0	0	0	5	6	10
70 to 80,	1840,	1	3	1	0	0	0	1	3	3	6
	1841,	1	4	1	0	0	0	0	2	2	6
	1842,	1	3	0	0	0	0	0	0	1	3
	Total.	3	10	2	0	0	0	1	5	6	15
80 to 90,	1840,	0	1	0	0	0	1	1	1	1	3
	1841,	0	1	0	1	0	0	0	0	0	2
	1842,	0	3	0	0	0	0	0	0	0	3
	Total.	0	5	0	1	0	1	1	1	1	8
Gross total.		18	29	3	6	1	1	4	15	26	51

The proportion in each year of the above was, 1840, males 12, females, 20, total 32; in 1841, males 8, females 17, total, 25; in 1842, males 6, females, 14, total 20. Hence, it would appear there has been a decrease in the mortality from bronchitis in each succeeding year.

Twenty-four cases of hydrothorax, and twelve of pleuritis are included in the following.

TABLE III.—(MALES.)

Case 450.—Aged 6 years. Hydrothorax, combined with ascites and anasarca; body pale; lower extremities slightly oedematous; brought in for interment same day with that of his sister's, aged 9 years, who died of pneumonia; no history of the case.

Head.—A foramen near vertex, which gave passage to a vessel size of a crow-quill; brain natural.

Chest contained one pint of fluid ; condensation of the structure of lower lobes of both lungs ; right, $7\frac{1}{2}$ ounces ; left, $6\frac{1}{2}$ ounces.

Abdomen contained a large quantity of fluid ; mesenteric glands enlarged ; liver, 29 ounces ; kidneys, $4\frac{1}{2}$ ounces.

Case 451.—A delicate boy, aged 11 years ; admitted three weeks before death, with ulceration of the toes ; had also a scald from hot water on the upper part of right thigh. Convulsions occurred, and death in four hours afterwards.

Head.—Brain slightly congested ; weight, $48\frac{1}{2}$ ounces.

Chest contained about a pint and a-half of clear fluid, principally on right side ; no appearance of lymph ; right lung, $7\frac{1}{2}$ ounces ; left, 8 ounces ; heart, 4 ounces.

Abdomen.—Organs healthy ; kidneys, $5\frac{1}{2}$ ounces ; liver, $32\frac{1}{2}$ ounces ; spleen, 1 ounce.

Case 452.—A currier, aged 32 years ; hydrothorax combined with anasarca, emphysema of lungs, and enlargement of the heart. Admitted four weeks before death.

Head.—Brain natural.

Chest.—Left pleura contained about two pints of clear fluid ; lower portion of left lung compressed ; emphysema of upper lobes both lungs ; weight together, 64 ounces. Heart, right ventricle much thickened ; all the cavities larger than natural ; weight, $16\frac{1}{2}$ ounces.

Abdomen.—Organs enlarged ; liver, 57 ounces ; kidneys, $13\frac{1}{2}$ ounces ; spleen, $6\frac{1}{2}$ ounces ; pancreas, 6 ounces ; stomach, 7 ounces ; slight but general anasarca.

Case 453.—Tailor, aged 38 years ; hydrothorax, ascites, and anasarca, combined with paralysis, asthma, enlarged heart, diseased liver and kidneys ; very ill for six weeks previous to admission, at which time he had an apoplectic fit ; his left leg has been since paralyzed. He died four days after admission.

Head.—In the right *corpus striatum* was a cavity large enough to admit a split horse bean.

Chest contained a quantity of fluid ; emphysema of edges of lungs, and redness of bronchial lining membrane ; lungs together weighed 44 ounces. Heart, left ventricle greatly thickened ; weight, $17\frac{1}{2}$ ounces.

Abdomen.—Liver large, hobnail appearance on surface, hard structure ; weight, 62 ounces ; kidneys large, granular ; weight, $13\frac{1}{2}$ ounces ; spleen, $8\frac{1}{2}$ ounces ; stomach, $6\frac{1}{2}$ ounces.

Case 454.—Aged 46 years ; hydrothorax combined with pulmonary tubercles ; ascites and carcinoma of liver. Died eight weeks after admission ; urine not albuminous.

Head.—Brain natural.

Chest.—Old pleuritic adhesions lower portion right lung ; upper portion surrounded by straw-coloured fluid ; a large quantity of similar fluid in left pleura ; pleuritic adhesion upper lobe left lung ; a small tuberculous cavity and some tubercles in the apex ; some serous infiltration of the lower lobe ; right weighed 19 ounces ; left, $22\frac{1}{2}$ ounces ; heart small, somewhat to the right side ; weight, $6\frac{1}{2}$ ounces.

Abdomen.—Distended with fluid similar to that in the chest. A carcinomatous mass occupied the capsule of Glisson and lesser curvature of stomach, which organ was soft and readily torn at this part ; the under surface of liver opposite the diseased part in a gangrenous state ; a carcinomatous mass in the Spigelian tube ; a white mass as large as an orange in the upper portion of right lobe ; the capsule covering it in a semicartilaginous state, and the interior filled with fluid colour of bile, and hydatids ; capsule of spleen thickened ; spleen, $7\frac{1}{2}$ ounces ; kidneys small, 6 ounces.

Case 455.—Servant, aged 50 years ; hydrothorax combined with *hydrops pericardii*, enlarged heart, and granular kidneys. Ill for six months previous to admission ; orthopnea for last two weeks ; urine albuminous, of

low specific gravity ; small ulcers on legs nearly healed. Died four weeks after admission.

Head.—Arachnoid membrane opaque.

Chest contained about two pints of fluid ; structure of lower lobe right lung condensed ; lower lobe left lung in second stage pneumonia ; right, 23½ ounces ; left, 33 ounces ; pericardium contained a pint of fluid ; heart greatly enlarged ; parietes thickened ; fibrine in cavities ; weight, 32½ ounces ; atheromatous* degeneration in aorta.

Abdomen contained about a pint and a-half of fluid ; liver greatly enlarged ; the coronary ligament had an osseous plate about three-quarters of an inch square in its centre ; weight of liver, 87 ounces ; capsules of kidneys peeled off readily ; their surface had a white granular appearance ; the left contained a cyst size of a walnut ; kidneys weighed 9½ ounces ; mucous membrane of intestines thickened.

Case 456.—Aged 73 years ; hydrothorax combined with ascites, anasarca, and enlarged heart. Died five weeks after admission.

Head.—Wasting of convolutions and fluid on surface of brain.

Chest.—Contained two pints of fluid ; some condensation of structure of lungs, and congestion of the right ; weight, 27 ounces ; left, 18½ ounces ; heart greatly enlarged and thickened ; weight, 23½ ounces ; a bony ring round root of the aorta.

Abdomen contained some fluid ; kidneys large, 11½ ounces ; congestion of the mucous membrane of stomach.

Case 457.—Gardener, aged 75 years ; hydrothorax combined with pericarditis and pleuritis. Died in chronic ward workhouse ; for many months a patient in the Infirmary for general dropsy.

Head.—Slight congestion of brain.

Chest.—Left side much smaller than right ; a very large quantity of fluid (several pints) in chest ; right lung very large, emphysematous, did not collapse ; left lung compressed against spine ; pleura covering it as thick as half-a crown ; right, 28 ounces ; left, 12½ ounces ; old and firm adhesions between heart and pericardium ; heart enlarged, 16½ ounces.

Abdomen.—Liver, left lobe small, capsule opaque, weight, 55 ounces ; two calculi, size of a horse bean, in left kidney, and some gravel ; weight of kidneys, 11 ounces.

Case 458.—Gardener, aged 78 years. Hydrothorax, complicated with pericarditis, and *hydrops pericardii* ; subject to rheumatism ; felt an acute pain in chest ; hæmoptysis one week before admission. Died in six days after ; urine albuminous, of light specific gravity.

Head.—Brain natural.

Chest.—Contained two pints of fluid, most in left pleura ; lower lobe right lung adherent to diaphragm, congested ; right weighed 25½ ounces ; left lung, 19½ ounces ; heart coated with recent lymph, enlarged and thickened ; pericardium contained about one pint of fluid, not adherent to heart ; atheromatous deposits in aorta ; fatty globules and crystals of cholesterine, shown by Mr Gulliver in the diseased portion.

Abdomen.—Kidneys granular, wasted ; small cysts on their surface ; ulceration of mucous membrane intestines.

FEMALES.

Case 459.—Aged 4 years, the subject of a coroner's inquest ; died suddenly ; supposed to have eaten some poisonous substance picked up in the street. The body examined at the parents' lodgings. Hydrothorax combined with ascites.

Head.—Brain large ; the ventricles dilated ; containing more fluid than natural.

* It would appear from Mr Gulliver's observations that this is, in reality, a fatty degeneration. See Notes, p. 163.

Chest contained a large quantity of fluid, most on the right side; pleura considerably thickened.

Abdomen.—Also contained a considerable quantity of fluid.

Case 460.—Female, aged 34 years. Hydrothorax, combined with anasarca, disease of the heart, and liver. Affected with dyspnoea for several weeks; want of sleep; pain in chest, and dulness on percussion; anasarca of face, thighs, and legs; rusty-coloured sputum. Died four weeks after admission.

Head.—Brain natural.

Chest nearly filled with a straw-coloured fluid; lungs compressed; no pleuritic adhesions or thickening of pleura; lungs together weighed 23 ounces; heart enlarged; mitral valves thickened, and warty excrescences to their margin, (fibrine); weight of heart, 15 ounces.

Abdomen.—Liver enlarged, 78 ounces.

Case 461.—Female, aged 35 years. Hydrothorax combined with bronchitis. Died three days after admission.

Head.—Brain natural.

Chest.—A considerable quantity of fluid in the left side; redness of the bronchial lining membrane in both lungs; right, 17½ ounces; left, 12½ ounces; heart enlarged, 12½ ounces.

Abdomen.—Liver large, 58 ounces; kidneys small, 7 ounces.

Case 462.—Female, aged 36 years. Hydrothorax combined with bronchitis, pulmonary tubercles, and peritonitis; has had a cough for seven months, and hæmoptysis for three months previous to admission; pain and tenderness of abdomen for five weeks previous to death, which occurred three months after her admission; body much emaciated.

Head.—Congestion of brain.

Chest contained a large quantity of fluid; pleuritic adhesions of upper lobes both lungs; a few tubercles in the apex of each; redness of the bronchial lining membrane; right, 18 ounces; left, 16 ounces; heart small, 6½ ounces.

Abdomen tympanitic; old peritoneal adhesions of liver and spleen; both organs enlarged; some redness of the external surface of small intestines, and recent lymph in pelvis on left side; mucous membrane of intestines healthy; liver, 56 ounces; spleen, 10½ ounces; left kidney much larger than right; its weight 8 ounces; right kidney wasted, only 3 ounces; stomach, 7 ounces.

Case 463.—Charwoman, aged 41 years. Hydrothorax, ascites, anasarca, and diseased heart; subject to cough for six years; caught cold about three months before admission; dropsical swellings came on, from that time urine scanty, high-coloured, passed with pain; thirst; no appetite; bowels open; pulse at wrist feeble and quick; action of heart tumultuous; the urine was afterwards passed without pain, and in greater quantity; the swelling of the abdomen became less; that in legs continued about the same. Six days before death, cough and dyspnoea became urgent; there was loss of sleep; breathing became gradually day by day more oppressed; dropsical swellings again increased; countenance anxious; death occurred ten days after admission.

Head.—Brain natural.

Chest contained one pint of fluid; emphysema of upper lobes lungs; weight together, 34½ ounces; heart enlarged; mitral valves thickened; weight, 13½ ounces.

Abdomen contained some fluid; liver large, 57 ounces; kidneys, 10 ounces; right ovary diseased; Fallopian tube contained one drachm of purulent matter; anasarca of legs and thighs.

Case 464.—Publican's wife, aged 56 years. Hydrothorax combined with bronchitis, pericarditis, enlarged heart, and anasarca; in a moribund state on admission; died the day afterwards.

Head.—Brain natural.

Chest contained three pints of fluid; emphysema of edges and upper lobes of lungs; congestion of their lower lobes; redness and thickening of bronchial lining membrane in each; right, 26½ ounces; left, 26½ ounces. Heart enlarged, 17 ounces; pericardium filled with a bloody sanies, a thin coating of recent lymph on its surfaces; atheromatous deposit in aorta.

Abdomen.—Liver large, 55 ounces; kidneys, 8 ounces; anasarca of the lower extremities.

Case 465.—Female, aged 66 years. Hydrothorax combined with diseased lungs and enlarged heart. She died 25 days after admission.

Head.—Brain firm; congestion of substance.

Chest contained about four pints of fluid; slight pleuritic adhesions to upper lobe left lung; earthy deposits in and a puckering of the pleura covering the apex; pleura thickened, and lungs compressed by fluid; a portion of the lower lobe right lung coated with lymph, a part of it hepatized; general bronchitis; right, 21 ounces; left, 13½ ounces. Heart enlarged, walls thickened; endocardium opaque in auricles; valves thicker than natural; weight of heart, 12½ ounces.

Abdomen.—Kidneys wasted; several small cysts both on the surface and in their substance, weight 4½ ounces; spleen small, 2 ounces; in its substance was a semicartilaginous body size of a pea.

Case 466.—Charwoman, aged 68 years. Hydrothorax combined with enlarged heart and granular kidneys. For some years subject to *angina pectoris*. In a moribund state on admission; died the same day.

Head.—Brain natural.

Chest contained two pints of fluid; lungs compressed, left one most so; right, 18 ounces; left, 14 ounces. Heart enlarged merely; no valvular diseases or osseous matter; weight, 16½ ounces.

Abdomen.—Congestion of entire of mucous membrane of the intestines; liver small, 34 ounces; kidneys granular, weight 7 ounces.

Case 467.—Female, aged 70 years. Hydrothorax, combined with anasarca and diseased kidneys; ill for six weeks previous to admission. Died the day after.

Head.—Brain natural.

Chest.—Curvature of spine backwards; fluid in both sides; left lung compressed, apex indurated; pleuritic adhesions and pleura thickened on left side; right lung slightly compressed; weight, 7½ ounces; left, 8½ ounces. Heart small, 6½ ounces.

Abdomen.—Liver small, 28 ounces. Kidneys unusually firm; weight, 7 ounces.

Case 468.—Servant, work-house, aged 72 years. Hydrothorax combined with ascites, anasarca, and enlarged heart; subject to palpitation of the heart for the last twelve years, cough and orthopnea; dropsical swellings last three weeks; afraid to lie down or to go to sleep; blueness of face. Died seven weeks after admission.

Head.—Brain natural.

Chest.—About one pint of fluid in left side; lower lobe left lungs compressed, dark-coloured; emphysema of right lung; congestion of lower lobe; weight, 21½ ounces; left, 15 ounces. Heart large, cavities distended with clots like black currant jelly; weight, 13½ ounces.

Abdomen.—Liver, venous hepatic congestion; weight, 42½ ounces. Kidneys soft, pale, capsules readily peeled off, weight 9 ounces; renal capsules of unequal size; right one round, size of a pigeon's egg; examined by Mr Gulliver, who states there is fatty accumulation, chiefly oleine; weight of right capsule, ¼ ounce and 1 drachm; left capsule, 2 drachms; intestines healthy; anasarca of lower extremities.

Case 469.—Female, aged 72 years; died in chronic ward work-house. Hydrothorax complicated with bronchitis and disease of the heart; bed-ridden for a considerable time; body emaciated.

Head.—Skull unusually thick, and *dura mater* adhering to it.

Chest contained a considerable quantity of straw-coloured fluid; posterior portions of lungs compressed; no pleuritic adhesions; redness and thickening of lining membrane, bronchial tubes; lungs together weighed 19 ounces. Heart small; a bony ring at the auricular ventricular opening of left side; bony degeneration at roots of sigmoid valves of aorta; mitral valve thickened; weight, $5\frac{1}{2}$ ounces.

Abdomen.—Organs small; liver, $27\frac{1}{2}$ ounces; kidneys, 4 ounces; stomach, $2\frac{3}{4}$ ounces. Uterus had attached to it several fibrous tumours, some of considerable size, with osseous matter in their centre; the organ with the tumours attached weighed $90\frac{1}{2}$ ounces.

Case 470.—Female from work-house, aged 74 years. Has been a patient in the infirmary on two or three occasions, for disease of the chest, attended with dropsical swellings, which latter disappeared under treatment. Died 19 days after admission.

Head.—Lateral ventricles dilated, contained between one and two ounces of clear fluid.

Chest.—No pleuritic adhesions, it contained a considerable quantity of fluid; lungs slightly compressed; some congestion of right lower lobe; right, 19 ounces; left, $11\frac{1}{2}$ ounces. Heart enlarged, cavities dilated; weight, 18 ounces.

Abdomen.—Liver small, dark-coloured, structure granular: weight, 31 ounces.

Case 471.—Female from work-house, aged 83 years. Hydrothorax combined with bronchitis, diseased heart, and anasarca; an old asthmatic anasarca of the lower extremities for some months; affected with diarrhoea. Died one month after admission.

Head.—Brain natural.

Chest.—Contained two pints of fluid; lower lobes of lungs compressed, their under surface adherent to diaphragm; redness of bronchial lining membrane; congestion lower lobe left lung; right, $14\frac{1}{2}$ ounces; left, 21 ounces. Heart, left ventricle thickened, weight, 12 ounces.

Abdomen.—Liver small, 30 ounces; kidneys wasted, $5\frac{1}{2}$ ounces; a large bony and several small fibrous tumours attached to uterus; weight, 14 ounces; intestines healthy.

Case 472.—Female, aged 84 years. Admitted to infirmary for gangrenous sores on hips and sacrum, bedridden for some time; chronic disease of brain soon healed. Died of hydrothorax four months after admission.

Head.—Brain firm, lateral ventricles dilated, contained about $1\frac{1}{2}$ ounce clear fluid.

Chest.—Right lung large, did not collapse; œdema of lower lobe, and posterior portion of upper; pleuritic adhesions on left side; about $1\frac{1}{2}$ pint fluid in left pleura; right $22\frac{1}{2}$ ounces; left, 10 ounces. Heart $10\frac{1}{2}$ ounces.

Abdomen.—Organs small; liver, 33 ounces; kidneys, 7 ounces; pancreas, 2; stomach $3\frac{1}{2}$; intestines healthy.

Case 473.—Female from work-house, aged 88 years. Hydrothorax combined with chronic bronchitis, anasarca, and disease of the brain. In a chronic ward workhouse; affected with the garrulous fatuity of old age. She died ten days after admission to the infirmary.

Head.—Convulsions wasted; fluid on surface of brain: a light-brown coloured mass size of a boy's marble to each "choroid plexus;" the one on the left side also attached to the floor of the ventricle. These had a scaly, crystalline appearance. Dr Gamble tested a portion with ether, and believed it to consist principally of stearine, afterwards proved to be cholesterine.

Chest.—A pint of fluid in left pleura; lower lobe of left lung compressed, and indurated. Pleuritic adhesions on right side; redness and thick-

ening of bronchial lining membranes; right, $21\frac{1}{4}$ ounces; left, $21\frac{1}{4}$ ounces. Heart $10\frac{1}{4}$ ounces.

Abdomen.—Liver small, $32\frac{1}{4}$ ounces; gall-bladder filled with calculi, so hard in structure they could not be cut with a scalpel; when broken, crystals of cholesterine found in centre.

PLEURITIS (MALES.)

Case 47.—Male infant, aged $3\frac{1}{4}$ days; brought in for interment; no history; pleuritis combined with solid lungs.

Head.—Brain natural.

Chest contained 2 ounces by measure of reddish fluid mixed with flakes of lymph. The under surface of both lungs connected with diaphragm by a coating of recent lymph; lower lobes red and solid; right, $1\frac{1}{4}$ ounce; left, 1 ounce 1 drachm.

Abdomen.—Organs natural; length of body 21 inches, and weight 8 pounds 7 ounces.

Case 475.—Male infant, aged 2 months. Pleuritis combined with abscess in spinal canal; child died seven days after admission.

Head.—Brain natural; an abscess pointing below the occiput; an opening discharging matter at the sacrum; partial destruction of the intervertebral substance; slight redness of the lining membrane spinal column; spinal cord natural appearance.

Chest.—About 3 ounces of purulent matter in left side; left lung compressed; pneumonia of lower lobe right lung; right, $1\frac{1}{4}$ ounce; left, $\frac{3}{4}$ ounce.

Abdomen.—Organs natural.

Case 476.—Male infant, aged 8 months. Pleuritis combined with indurated lungs; tumid abdomen for two months previous to admission; came from the country five weeks before, where it had been under treatment; breathing short for the last two weeks, child died sixteen days after admission.

Head.—Brain natural.

Chest.—Purulent matter in right side; pleura appeared thickened, and partly covered with flakes of lymph; clear fluid in the left side.

Lungs.—Structure condensed; doughy feel; not easily broken down by pressure; weight together 17 ounces.

Case 447.—Male, aged 50 years. Pleuritis, empyema, left side, and displacement of the heart. The operation of "paracentesis thoracis," twice performed, and a large quantity of clear fluid drawn off each time. Death occurred $16\frac{1}{4}$ weeks after admission.

Head.—Brain natural.

Chest.—Six pints of purulent matter in left side; lung compressed against spine, about $\frac{1}{4}$ of an inch in thickness; a small nobe or finger-like process on the situation of the upper lobe; a very small bronchial tube on same side; pleura rough, and right lung larger than ordinary, lower lobe congested; weight of right lung, $32\frac{1}{2}$ ounces. Heart displaced, somewhat to the right of the middle line; weight, $11\frac{1}{4}$ ounces.

Abdomen.—Liver enlarged, 72 ounces; kidneys enlarged, $16\frac{1}{4}$ ounces; cysts in one.

Case 478.—Labourer, married, aged 65 years. Pleuritis left side, emphysema, enlarged heart, &c.; for some time in work-house; admitted to infirmary with typhus fever 6 weeks before death; subject to cough 30 years. The symptoms of pleuritic effusion became manifest 2 weeks before death; dull sound on left side inferiorly, changing with change of position; deficiency of respiration; pulse intermitting, rather full and strong; bowels very much purged; mouth sore from mercury; febrile symptoms reappeared; tongue became white and furred; pulse small and weak; he gradually sunk.

Head.—Brain firm.

Chest.—Emphysema of upper lobes lungs, especially of the right; its lower lobe and posterior portion of upper congested; left pleura contained between three and four pints of fluid, and was thickly coated with recent lymph; right lung, 34 ounces; left, 17½ ounces. Heart enlarged, 13½ ounces.

Abdomen.—Liver large, 51½ ounces; kidneys, 10; bladder distended; ecchymosis in spots size of 4d. in submucous tissue.

Case 479.—Male, aged 68 years. Pleuritis right side, combined with bronchitis; tuberculous cavities in left lung, and chronic disease of the brain. From a chronic ward in work-house, died the day after admission.

Head.—Brain pale; lateral ventricles dilated; contained about 1 ounce clear fluid.

Chest.—From 8 to 10 ounces of fluid in the right side mixed with flakes of lymph; pleura very red, and partly coated with lymph, as well as the lower lobe of lung. Numerous small tuberculous cavities, dark-coloured, with surrounding induration in apex of left lung; right weighed 25½ ounces; left, 22 ounces. Heart, 10½ ounces; auricles distended with clots of blood; and some clots also in aorta.

Abdomen.—Liver 34½ ounces; kidneys wasted, 5½ ounces; mucous membrane; intestines healthy; knees contracted; right thigh had formerly been broken at lower third, and united at an angle.

Case 490.—Clerk in work-house, aged 69 years, an habitual drunkard; died suddenly in work-house immediately after drinking off a pint of porter; previously going about as usual. Coroner's inquest held. Pleuritis combined with bronchitis and enlarged heart.

Head.—Brain natural.

Chest.—About two pints of fluid in left side, and the costal and pulmonary pleura of same side coated with lymph; general bronchitis: right lung, 29½ ounces; left, 27½ ounces. Heart enlarged, dilatation and thickening of right ventricle; weight, 15½ ounces.

Abdomen.—Liver large, 52½ ounces; kidneys large, 13 ounces; stomach enlarged and distended; weight, 8 ounces.

Case 481.—Male, aged 70 years, died in chronic ward work-house. Pleuritis combined with pulmonary tubercles, and pneumonia right lung.

Head.—Brain natural.

Chest contained about two pints of fluid; old pleuritic adhesions; emphysema of right lung, some tubercles in its apex, and inflammation; pleura thickened on left side; a coating of recent lymph on lower lobe, left lung; right weighed 30 ounces; left, 19 ounces. Heart, 8½ ounces.

Abdomen.—General atrophy of organs; liver, 24 ounces; kidneys, 5½ ounces; spleen, 3½; stomach, 3½ ounces; pancreas, 2 ounces.

Case 482.—Male, aged 76 years. Admitted from work-house chronic ward; great dyspnoea; hot clammy perspiration; feeble quick pulse; asthmatic for many years; died 2 days after admission; pleuritis combined with bronchitis.

Head.—Brain natural.

Chest.—Right side contained between two and three pints of yellow fluid lung compressed and thickly coated with lymph; oedema of the lower lobe left lung; on its posterior aspect a thin coating of recent lymph; general bronchitis; right weighed 24½ ounces; left, 19½ ounces. Heart enlarged, 15½ ounces.

Abdomen.—Liver large, 50½ ounces; kidneys, 10 ounces.

PLEURITIS, (FEMALES.)

Case 483.—Female child, aged 2 years; attended at home; brought in previous to interment. "Bulla" on chest and face, some had disappeared, and large superficial dark marks in their place.

Head.—Brain natural.

Chest.—More than 6 ounces by measure of purulent matter in left side; left lung compressed, and coated with lymph; right dilated, about three times as large as left; weighed 3 ounces 2 drachms; left, 2½ ounces and 2 drachms.

Abdomen.—Organs natural.

Case 484.—Charwoman, aged 63 years. Cough for four months previous to admission; difficulty in ascending the stairs; blueness about face and neck; orthopnoea and spasm for six days before death, which occurred 16 days after admission. Pleuritis, complicated with enlarged heart and pulmonary apoplexy.

Head.—A quantity of blood escaped from scalp. Brain natural.

Chest.—Contained about two pints of dark fluid, and flakes of lymph; no pleuritic adhesions; congestion of lower lobes; a blood-clot, size of a walnut, in lower lobe, left lung; general bronchitis; right, 18½ ounces; left, 19½ ounces. Heart enlarged, 15 ounces.

Abdomen.—Liver, venous hepatic congestion; mucous membrane of small intestines congested.

Case 485.—Female, aged 83 years, died in a chronic ward in work-house. Pleuritis combined with chronic disease of the brain.

Head.—Opacity and apparent thickening of the arachnoid; lateral ventricles of brain dilated, containing between 3 and 4 ounces of clear fluid; septum thin, semitransparent.

Chest contained a considerable quantity of straw-coloured fluid; structure of left lung condensed; pleura thickly coated with lymph; a quantity of black fluid like tar in the lower lobes of both lungs; right, 23 ounces; left, 17½ ounces. Heart dilated, flabby, 12½ ounces.

Abdomen.—Organs natural.

The following is an abstract of the age, sex, and number in each quarter for three years, 1840–42, inclusive, of the foregoing 36 cases of hydrothorax and pleuritis. TABLE D.

Ages.	Years.	1st Qr.		2d Qr.		3d Qr.		4th Qr.		Total.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 2 years,	1840,	0	0	1*	0	0	0	0	0	1	0
	1841,	0	0	0	0	0	0	1*	0	1	0
	1842,	0	0	0	0	0	0	1*	0	1	0
	Total,	0	0	1	0	0	0	2	0	3	0
From 2 to 7 years,	1840,	0	0	0	0	0	0	0	0	0	0
	1841,	0	0	0	0	0	0	1	0	1	0
	1842,	0	0	0	1	0	1*	0	0	0	2
	Total,	0	0	0	1	0	1	1	0	1	2
From 7 to 20 years,	1840,	0	0	0	0	0	0	0	0	0	0
	1841,	1	0	0	0	0	0	0	0	1	0
	1842,	0	0	0	0	0	0	0	0	0	0
	Total,	1	0	0	0	0	0	0	0	1	0
From 20 to 30 years,	1840,	0	0	0	0	0	0	0	0	0	0
	1841,	0	0	0	0	0	0	0	0	0	0
	1842,	0	0	0	0	0	0	0	0	0	0
	Total,	0	0	0	0	0	0	0	0	0	0

* Denotes pleuritis.

Ages.	Years.	1st Qr.		2d Qr.		3d Qr.		4th Qr.		Total.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
From 30 to 40 years,	1840,	2	0	0	0	0	1	0	1	2	2
	1841,	0	0	0	0	0	1	0	0	0	1
	1842,	0	0	0	0	0	0	0	0	0	0
	Total,	2	0	0	0	0	2	0	1	2	3
From 40 to 50 years,	1840,	0	0	0	0	0	0	0	1	0	0
	1841,	0	0	0	0	1	0	0	0	1	0
	1842,	0	0	0	0	1	0	0	0	1	0
	Total,	0	0	0	0	2	0	0	1	2	0
From 50 to 60 years,	1840,	0	1*	0	0	0	0	0	0	0	1
	1841,	0	0	0	0	0	0	0	0	0	0
	1842,	0	0	0	0	0	1	0	0	0	1
	Total,	0	1	0	0	0	1	0	0	0	2
From 60 to 70 years,	1840,	0	0	1*	0	0	0	1*	0	2	0
	1841,	0	0	0	1	0	0	1*	0	1	1
	1842,	0	0	0	0	0	2*1	0	0	0	2
	Total,	0	0	1	1	0	2	2	0	3	3
From 70 to 87 years,	1840,	0	0	0	0	0	1	3*2	0	3	1
	1841,	0	0	0	0	1	3*1	0	0	1	3
	1842,	0	1	0	2	1	1	0	0	1	4
	Total,	0	1	0	2	2	5	3	0	5	8
Gross Total,		3	2	2	4	4	11	8	2	17	19

Age.—The earliest age afforded examples of pleuritis, only, more than half were 60 years and upwards, the oldest a woman of 87.

Sex.—The numbers of each were nearly alike.

Season.—It appears that the third quarter, generally the warmest period of the year, has been most most favourable to these diseases. Nearly 14 per cent. occurred in the first quarter; 16½ per cent. in the second quarter; 41½ per cent. in the third quarter; and nearly 28 per cent. in the fourth quarter. Numbers in each year were—in 1840, males, 8; females, 5; total, 13; in 1841, males, 6; females, 5; total, 11; in 1842, males, 3; females, 9; total, 12,—a pretty equal distribution.

Vascular System.—The ten following cases, in addition to those already published, complete the number arranged under this head for the three years ending 1842.

Case 486.—Coachman, single, aged 56 years. Pericarditis, complicated with enlarged heart; emphysema and oedema of lungs; long subject to cough. For two months previous to admission had been affected with rheumatic gout, for which he had been taking medicine. In an exceed-

* Denotes pleuritis.

ingly low state on admission ; pulse very feeble ; death occurred five days after.

Head.—A considerable quantity of fluid on the surface of the brain.

Chest.—Slight pleuritic adhesions behind ; emphysema and œdema of lungs ; their structure loaded with light-coloured fluid, which was readily pressed from divided surfaces ; crepitation remained ; right weighed 35½ ounces ; left, 30 ounces ; pericardium firmly and extensively adherent to the heart ; auricles distended with pale fibrine ; organ enlarged ; weight, 17½ ounces.

Abdomen.—Fatty omentum ; liver large, pale, like wax when cut, yielding and pitting on pressure, not breaking down ; portions of liver in this state have been examined by Mr Gulliver, (*vide Notes*), who found in them inspissated mucus in large quantities ; weight, 75 ounces ; kidneys enlarged, 14 ounces ; spleen enlarged, 14 ounces ; stomach, 9 ounces ; pancreas, 5 ounces ; large intestines contracted ; their mucous membrane of a pale colour.

Case 487.—Female child, aged 6 months. Pericarditis, combined with pleuritis and hydrocephalus ; slight cough on admission ; anæmia ; diarrhoea ; and dilatation of the pupils two days before death, which took place ten days after admission.

Head.—Ventricles of brain contained about half an ounce of clear fluid.

Chest.—Structure of lower portion of right lung compressed ; its surface coated with recent lymph ; congestion of the lower lobe left lung ; ecchymosis beneath pleura, and a slight roughness of the latter from adherent fibrine ; right, 1 ounce 1 drachm ; left, 1½ ounce ; pericardium distended with yellow fluid, its interior, as well as the surface of the heart, coated with recent lymph, and fibrinous bands uniting them ; heart weighed 1 ounce.

Abdomen.—Organs natural.

Case 488.—Female, aged 27 years. Endocarditis combined with pericarditis ; enlargement of the heart and pleuritis ; found dead in bed in a court in this neighbourhood ; mother of four children. A coroner's inquest was held. The woman's mother stated that she had never been strong, or able to do hard work ; was generally troubled with a cough, and that her health was worse since her confinement with her last child, then 6 months old. She was in the habit of drinking large quantities of beer, and was confined to bed ill the day before her death.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides ; some congestion in lower lobe right lung ; weight, 22½ ounces ; left, 18½ ounces. Heart enlarged, old adhesions between it and pericardium ; lining membrane of auricles opaque ; at the left auriculo-ventricular opening, a surface of an inch broad, and about two-thirds the circumference was coated with firm adherent fibrine, which Mr Gulliver found to contain particles of phosphate of lime ; there was also fibrine adherent to edges of mitral and sigmoid valves of aorta ; heart weighed 17½ ounces ; aorta, the calibre smaller than usual.

Abdomen.—Liver large, congested ; the surface had a marbled appearance ; weight, 62 ounces ; kidney large, pale, capsules readily pulled off, 10½ ounces ; spleen large, 12½ ounces ; stomach distended with fluid like porter, no redness ; dark matter in small intestines ; a slimy fawn-coloured matter in the large, mucous membrane natural throughout ; legs œdematous.

Case 489.—Female, aged 48 years. Pericarditis, combined with endocarditis, pleuritis, and anasarca. Died in Middlesex Hospital ; no history of case ; brought in previous to interment.

Head.—Lateral ventricles contained one ounce of clear fluid.

Chest.—Half a pint of fluid in left pleura ; pleuritic adhesions on right side, and congestion of lower lobe right lung ; weight, 21½ ounces ; left, 14½ ounces ; pericardium contained three ounces of straw-coloured fluid.

Heart enlarged, endocardium in auricles opaque, thickening of both the bicuspid and tricuspid valves; right auricular appendix filled with firm adherent fibrine; heart weighed 13 ounces.

Abdomen.—Liver, venous hepatic congestion; dark mottled appearance; right renal capsule firmly adherent to liver, not more than half the size of the one on opposite side. Congestion of mucous membrane in large intestines. Anasarca of lower extremities; no obstruction in iliac vessels.

Case 490.—Female, aged 80 years. Pericarditis, combined with emphysema, bronchitis, and pneumonia. Died in a chronic ward work-house. Subject to cough; ulcerated legs for many years.

Head.—Brain wasted, as usual in old age; weight, 38 ounces.

Chest.—Pleuritic adhesions posteriorly on both sides; lungs very dark-coloured from an unusually large quantity of black matter, (a portion preserved for Dr Davy for chemical analysis, vide Mr Gulliver's Notes); pneumonia in the back part of upper lobe; left lung structure soft; the anterior portion of same lung oedematous, containing much dark-coloured fluid; emphysema of anterior thin edges of lungs; redness and thickening of bronchial mucous membrane; partial ossification, and dilatation of bronchial tubes; right, 16 ounces, left, 20 ounces. Heart large; surface covered with recent lymph; bands of fibrine extending to pericardium; auricles contained fibrine; the heart weighed 17 ounces.

Abdomen.—Kidneys small, firm, granular; weight, 5 ounces; some cysts containing dark fluid in the left kidney; mucous membrane of intestines healthy.

Case 491.—Female, aged 18 years. Phlebitis, combined with oedema of the right thigh and leg. Brought in for interment from Queen Charlotte's Lying-in Hospital; no history of case; child admitted to nursery workhouse.

Head.—Brain natural.

Chest.—Remains of thymus; weight, 2 drachms; slight plastic adhesions; cadaveric congestion in lower lobe left lung; right 11 ounces; left 16 ounces; heart, 8½ ounces.

Abdomen.—Liver large, 57 ounces; kidneys, 11½ ounces; uterus thin, dark-coloured internally; weight, 2¼ ounces; hips ulcerated; (bed-sores?) oedema of right thigh and leg; external iliac and femoral veins blocked up with fibrine, part escaped in a semifluid state from the former when divided about one inch above "Poupart's ligament;" the femoral vein divided two inches below "Poupart's ligament," and separated to be examined by Mr Gulliver; who found the "femoral vein obstructed by a clot with two points, size of a pin's-head, of central softening (vide Notes.) The pulpy matter brownish; a false membrane of a similar colour on the inner tunic of vein; the soft matter in the clot chiefly made up of granular matter, and minute molecules, with some ovoid and oval corpuscles, about twice as big as pus globules, and formed by an aggregation of circular oil-like particles, there were also, in the pulpy matter, a few large fatty globules; the false membrane contained similar molecules, corpuscles, and granular matter."

Case 492.—Uterine hemorrhage. Single, aged 23 years. For three months occasional hemorrhage; on the day before, and on the morning of her admission to the lying-in ward, there had been considerable hemorrhage; labour pains ineffective; in a very weak state on admission. Two doses, of twelve grains each, of ergot of rye administered; she was delivered of a living, full-grown female child the same afternoon; not the slightest hemorrhage occurred after delivery; she died notwithstanding in three hours after, on the same day she was admitted.

Head.—Brain exsanguineous, firm, weight, 39½ ounces.

Chest.—Organs exsanguineous, healthy; right lung weighed 9 ounces; left, 8½ ounces; heart, 8 ounces.

Abdomen.—Organs exsanguineous; liver, 49½ ounces; kidneys, 9 ounces;

spleen, 4 ounces; stomach, $5\frac{1}{4}$ ounces; pancreas, 2 ounces; uterus contracted to size of a pint-bottle, weight, $23\frac{1}{4}$ ounces.

Case 493.—Male infant, aged 6 weeks. Cachexy; born in lying-in-ward; mother had sore nipples, but these had healed, and the child was quite well when discharged from Infirmary, exactly 14 days before the body was examined; the child died out of the house and was brought in for interment. The weight of the child the day after it was born was 7 pounds 5 ounces; weight of the body when dead, 5 pounds 1 ounce; length, 21 inches.

Head.—Brain natural; weight, $17\frac{1}{2}$ ounces.

Chest.—Organs natural; right lung, half an ounce two drachms; left, half an ounce; heart, half an ounce.

Abdomen.—Organs natural; liver 4 ounces; stomach, $2\frac{1}{4}$ drachms; pancreas, $1\frac{1}{4}$ drachm; spleen, $2\frac{1}{4}$ drachms; kidneys, 1 ounce; thymus 1 drachm; mesenteric glands were somewhat enlarged. This infant had lost upwards of two pounds, or nearly a third of its weight, in a few days.*

Case 494.—Male infant; aged 7 weeks. Cachexy; extreme emaciation; slight appearance of hepatization in one lung; mother left her child to go to wet-nurse; death occurred the day after its admission to the infirmary; weight of body, 3 pounds 15 ounces; length, 18 inches.

Head.—Brain pale, $12\frac{1}{4}$ ounces.

Chest.—Slight hepatization in the lower lobe of right lung; weight 1 ounce; left, three quarters of an ounce; heart, 3 drachms.

Abdomen.—Liver, $2\frac{1}{4}$ ounces; stomach contracted, 2 drachms; pancreas, half a drachm; kidneys, half an ounce; thymus, half a drachm; spleen, $2\frac{1}{4}$ drachms; mesenteric glands appeared enlarged; *tunica vaginalis testis* contained some straw-coloured glairy fluid.

Case 495. — Male infant, aged 7 months; died out of the house; brought in for interment; no history. Cachexy; body emaciated; the two

* Previous to, and during the time the mother of the above child was in the lying-in-ward, I had been occupied (assisted by Mr Culpeper,) in ascertaining the mean temperature of the body, state of the pulse, &c. in particular diseases, and under various circumstances. Many observations were made in the lying-in-ward, and among others on the above woman on three, and on child upon two occasions. Those in relation to the mother were remarkable, as compared with those in other mothers in the same room, at the time, and taken by the same thermometers, being 3° higher than the highest, and 6° higher than the lowest. Upon the second occasion there was a reduction of 2° ; she was suffering from sore nipples both times. On the last occasion, the day she was discharged, a further reduction of 5° .

The temperature of the infant upon the first occasion was 6° lower than the mother's, and upon the second 3° lower. The respirations of the infant were a third more numerous than the mother's, being as 36 to 24 first time, and as 36 to 22 second time. The pulse of the mother on the first occasion was 127 in the sitting posture; that of the child 132, lying on the nurse's arm. On the second occasion and same positions, pulse of mother 80; that of child 132. Upon the third occasion, pulse of mother 93, after slight exertion. Time of day; first occasion, $\frac{1}{4}$ to 5 P. M.; second occasion, 2 o'clock P. M.; third occasion, 3 P. M.

The results of a great many observations were that the temperature of the mother exceeded that of the child generally about 2° , in a few instances the temperature of both were alike.

Respiration.—The number in a minute varied in the infants from one-half more, to double the number of their mothers. Pulse counted while the infant was in a quiescent state resting on the nurse's arm, or in bed; it could seldom be counted at the wrist in those under four days old; but in one, a day old, it was 180, and that of the mother 87; time, 3 o'clock P. M. In a second, four days old, while asleep, 96; mother's 84; time, 3 o'clock P. M. In infants of from nine to twenty-one days, the pulse varied from 114 to 156; and that of their mothers from 74 to 102; time when examined, from 1 to 4 o'clock P. M. One instance occurred, in which the pulse of an infant fifteen days old was 96, and its mother's 58; time, 1 o'clock P. M.; both healthy, of fair complexion. The women were sitting while their pulse was counted.

incisors of lower jaw the only teeth visible; weight of body, 7 pounds 4 ounces; length, 25 inches.

Head.—Brain weighed 23½ ounces.

Chest.—Organs healthy; right lung, 1 ounce 2 drachms; left, 1 ounce 1 drachm; heart, half an ounce.

Abdomen.—Organs natural; liver, 7 ounces; stomach, half an ounce; kidneys, 1 ounce; spleen, half an ounce; mesenteric glands enlarged.

Five, or one-half of the foregoing, have been cases of pericarditis; one of phlebitis; one of hemorrhage; and three of cachexy in infants.

TABLE E. The age, sex, and number in each quarter, for three years, 1840–42 inclusive, of the 66 cases of disease of the vascular system, are recapitulated in the following abstract.

Ages.	Yrs.	1st Quarter.		2d Qr.		3d Qr.		4th Qr.		Tot.	
		Males.	Females.	M.	F.	M.	F.	M.	F.	M.	F.
Under 2 years.	1840										
	1841										
	1842							3 C	1 A	3	1
	Tot.							3	1	3	1
From 2 to 7 years.	1840										
	1841		1 A								1
	1842										
	Tot.		1								1
From 7 to 20.	1840				1 A						1
	1841										1
	1842		1 D				1 E				2
	Tot.		1		1		1				3
20 to 30.	1840			1 A						1	1
	1841								1 A		1
	1842	2 B							2 A, F	2	2
	Tot.	2		1					3	3	3
30 to 40.	1840		1 A	1 A			1 A			1	2
	1841										
	1842	1 B	1 B							1	1
	Tot.		1 A	1 A			1			2	3
40 to 50.	1840	1	2	1			1			2	3
	1841	2 B, A	3 A, D, F	1 B		1 B				4	3
	1842	1 B								1	1
	Tot.		2 C, A	1 B			1 A			1	3
50 to 60.	1840	3	5	2		1	1			6	6
	1841			1 B	1 T		1 T			1	2
	1842	1 B	1 A			1 B		1 A	2 B	1	3
	Tot.		1 B						1 A	2	2
60 to 70.	1840	1		1	1	1	1	1	3	4	7
	1841	1 B			1 B	1 B	1 A			2	1
	1842			1 T				1 T	1 B	1	2
	Tot.									1	
Tot.		1		1	1	1	1	1	1	4	3

Ages.	Yrs.	1st Quarter.		2d Qr.		3d Qr.		4th Qr.		Tot.	
		Males.	Females.	M.	F.	M.	F.	M.	F.	M.	F.
70 to 80.	1840	2 B						1 B	2 T, B	3	2
	1841			1 B				1 B	1 B	2	1
	1842	2 B, A								2	
	Tot.	4		1				2	3	7	3
80 to 95.	1840				1 B						1
	1841			2 A					1 B	2	1
	1842		2 B						1 A		3
	Tot.		2	2	1				2	2	4
Gross	Tot.	12	13	9	4	3	5	7	13	31	36

To distinguish the diseases included under the above head, some letters have been introduced in the table; which have likewise the advantage of showing at a glance the relative frequency of the diseases, at different ages and seasons, in the two sexes. The letter A, denotes pericarditis; of which there has been 20 cases; 7 males, and 13 females;—B, enlargement, or hypertrophy of the heart; of which disease 30 have been recorded; 17 males, and 13 females;—C, cachexy; 4 cases; 3 male infants, and 1 female adult;—D, dropsy of the pericardium; 2 females;—E, phlebitis; 1 female;—T, aneurism; 6 cases; 2 in males, and 4 among females.

Age.—Pericarditis has affected all ages, from 6 months to 80 years and upwards. Enlargement of the heart, the middle aged, and those in the decline of life; it has generally been complicated with asthma, or dropsy, and sometimes with both; aneurism, persons from 50 to 70 years. About 12 per cent. of the cases occurred in those under 20 years; 16½ per cent., in those from 20 to 40 years; 34½ per cent. from 40 to 60 years; 25½ per cent. from 60 to 80; and 10½ per cent., in the remainder.

Sex.—There has been no material difference between the number of males and females affected.

Season.—Most of the deaths have occurred in the first and fourth quarters; fewest in the third quarter; 37½ per cent. of the deaths were in the first quarter; 20 per cent. in the second quarter; 12 per cent. in the third quarter; and 30½ per cent. in the fourth quarter.

Number of the above for each year.

1840, males, 12	females, 13	total 24
1841, 7	9	16
1842, 12	14	26

The numbers examined have been less in 1841 than in either of the other years.

ABDOMINAL ORGANS.

109 cases have already been published where these organs were either solely or principally affected; 23 more are here added, 5 males and 18 females, making 132, of which 54 were males and 78 females, being the total number examined of the above during the three years.

Case 496.—Bricklayer, married, aged 34 years. Peritonitis, congestion of brain, and dryness of the arachnoid, (incipient arachnitis?) Ill for six days previous to admission; abdomen tumid and extremely tender; tongue dry; extremities cold; vomiting, which seemed to be arrested by creosote; bowels became relaxed the day after admission; mercurial frictions applied externally, as well as the medicine used internally. The evening before his death he became quite delirious, shouting and getting out of bed; at the same time, the pulse was scarcely perceptible at the wrist; extremities cold; no heat of surface, except on the chest and face.

Head.—Vessels on surface of brain loaded with very dark blood; arachnoid membrane quite dry.

Chest.—Some slight pleuritic adhesions of old standing on right side; congestion of lower lobes of both lungs; most of left, and breadth of three fingers of lymph, on left lower lobe; right weighed 19½ ounces; left, 20 ounces; heart, 11 ounces.

Abdomen.—Contained a large quantity of purulent matter and flakes of lymph, almost covering the intestines, which were distended with air; some redness of the surface of small intestines; mucous membrane healthy; liver large, 64 ounces; some lymph on surface of spleen; weight, 8½ ounces.

Case 497.—Male, aged 41 years. Peritonitis, combined with ascites, cirrhosis, diseased kidneys, and anasarca. For many weeks a patient in the infirmary; admitted with anasarca and ascites; stated that he had been a patient in Middlesex Hospital, which he had just before left by his own wish; urine scanty; had acid properties; contained no albumen; the thighs and legs diminished in size after his admission; the dropsy of the belly increased; breathing became difficult; the operation of *paracentesis abdominalis* was performed, and a stable bucket-full of fluid drawn off. Symptoms of peritonitis came on, and he died five days after the operation: muscular structure of an unusually bright-red colour.

Head.—Membrane of brain of a red colour; organ weighed 60 ounces.

Chest.—Old pleuritic adhesions on both sides; congestion of lower lobes lungs; right, 24 ounces; left, 21½ ounces; heart, 8½ ounces; lining membrane of aorta of a bright-red colour, and easily separated from the middle coat.

Abdomen contained from three to four gallons of dark-coloured fluid; the intestines almost covered with a coating of false membrane as thin as tissue paper in most places; redness of the parietes for some distance around the puncture; stomach and intestines distended, their coats much thickened; cirrhosis; the liver a well marked specimen of what has been termed the "hob-nailed," small and hard; mottled dark and yellow; weight, 41 ounces; kidneys rather soft; marbled yellow and purple corpuscles readily peeled off; difference between tubular and cortical structures scarcely perceptible; weight of organs, 12½ ounces; spleen large, 10½ ounces; stomach, 9½ ounces; minute structure of false membrane depicted in Mr Gulliver's Contributions to Minute Anatomy, Lond. and Edin. Phil. Mag. October 1842, fig. 4, p. 243.

Case 498.—A girl, aged 8 years; peritonitis; admitted with a cutaneous disease of scalp; eleven days before death was attacked with diarrhoea, which was checked. No appearance of serious illness till two days before death.

Head.—Brain healthy.

Chest.—Slight congestion in lower lobes lungs; right, 8 ounces; left, 9 ounces; pericardium contained 1 ounce of clear fluid; heart weighed 3 ounces.

Abdomen.—Pelvis filled with purulent matter; false membrane on a portion of surface of the intestines and margin of the liver; mucous membrane intestines healthy; liver, 37 ounces; kidneys congested, $7\frac{1}{2}$ ounces.

Case 499.—A girl, aged 11 years; peritonitis and ulceration of bowels; fluid in brain (arachnitis); admitted with strumous ophthalmia; taken ill in the surgical ward (as the preceding one) with the ordinary symptoms of fever, pain of head complained of most; she lay in bed with limbs stretched at full length, without any complaint of abdominal pain.

Head.—Congestion of the brain, and three drachms of clear fluid in the lateral ventricles.

Chest.—Congestion in lower lobes lungs, probably only cadaveric; right, 8 ounces; left, $7\frac{1}{2}$ ounces.

Abdomen.—Pelvis contained six ounces of purulent matter; false membrane covering a portion of the intestines; an ulcer size of a halfpenny in ileum near cæcum, through both internal coats; a smaller ulcer size of a sixpence in the colon; liver, 44 ounces; spleen, 7 ounces; kidneys, $9\frac{1}{2}$ ounces. The girl of large stature; height, 4 feet 6 inches; weight, 59 pounds.

Case 500.—From lying-in-ward, aged 20 years. Puerperal peritonitis combined with pleuritis; delivered of a still-born child; complained of abdominal pain twelve days after; febrile symptoms were present, no pulmonary symptoms; she expressed relief from the abdominal pain; slightly delirious two days before death, and sudden collapse nine hours before she died—five days after the symptoms above related.

Head.—A more than usual quantity of fluid on surface and in ventricles of brain.

Chest.—Structure of lower lobes of both lungs condensed, and their surface in part covered by false membrane; right, 16 ounces; left, $12\frac{1}{2}$ ounces; heart, $10\frac{1}{2}$ ounces.

Abdomen.—A considerable quantity of purulent matter in pelvis; fundus of uterus, broad ligaments and ovaries covered by false membrane; some also on right lobe of liver, which was large, nutmeg; weight, 73 ounces; kidneys, 11 ounces; spleen, 11 ounces; uterus, $10\frac{1}{2}$ ounces.

Case 501.—From nursery, aged 22 years. Abscess in uterus and peritonitis combined with metritis and enlarged kidneys; she died five days after admission. Tenderness of abdomen; tongue dry on admission; the second night after there was a large discharge of fetid purulent matter, followed by a relief of the pain; the day following, however, symptoms of depression came on, and kept gradually increasing until she died.

Head.—Brain natural.

Chest.—No pleuritic adhesions; slight congestion lower lobe right lung; weight, $12\frac{1}{2}$ ounces; left, 9 ounces; heart, 7 ounces.

Abdomen.—A considerable quantity of purulent matter in the pelvis, mixed with flakes of lymph: some redness of surface of small intestines, a portion coated with false membrane; some matter appeared to have escaped from an open abscess situated between the broad ligament, right ovary, and fundus of the uterus. Fluctuation was felt on the right side of the uterus, (which appeared very large,) an abscess was found in its parietes containing between three and four ounces of thick purulent matter; walls of the abscess ragged, extending behind the body of the organ; kidneys large, pale, and irregular on surface; weight, 14 ounces; mucous membrane of intestines healthy.

Case 502.—Confined in lying-in-ward, aged 29 years. Puerperal peritonitis complicated with emphysema and bronchitis; admitted in the first instance to the infirmary; suffering from orthopnoea in an extreme degree;

œdema of lower extremities and face; about the eighth month of utero-gestation. She was removed to the lying-in-ward two days after admission, where she was confined of twins; both died when nine days old; orthopnea relieved after being confined; cough and shortness of breath still continued; she was removed again to a medical ward in five days after her confinement. In one week after uterine hæmorrhage came on, and continued for one day, and there was a slight return of it again after three days; symptoms of peritonitis occurred four days before her death; pain on pressure, and subsequently attended by vomiting, which continued till death, three weeks after her first admission.

Head.—Brain pale, more fluid than ordinary on surface.

Chest.—No pleuritic adhesions; emphysema of upper lobes; redness of the bronchial lining membrane; right, 12½ ounces; left, 13½ ounces; heart, 12½ ounces.

Abdomen contained about four pints of straw-coloured fluid; contents pale coloured; false membrane on intestines; liver, 49 ounces; kidneys, 11½ ounces; uterus covered by false membrane, dark, almost in a gangrenous state internally; weight, 9 ounces.

Case 503.—Aged 40 years. Metritis combined with peritonitis and pneumonia. Died out of the house; brought in for interment. Visited by a medical man two days before her death, who found severe symptoms of peritonitis complicated with pulmonary disease. Not pregnant since birth of youngest child, two years old.

Head.—Brain natural.

Chest.—Right lung small, collapsed; pneumonia in a portion of the lower lobe of left lung; right weighed 9 ounces; left, 15 ounces. Heart, 8½ ounces.

Abdomen.—Liver large; weight, 56½ ounces. Kidneys, right wasted, 1 ounce; left, 4 ounces. Uterus very large, its surface, as well as that of ovaries, and for some extent around, covered by false membranes. Lining membrane of uterus dark-coloured and rough; appearance of incipient gangrene; interior of right ovary dark-coloured and in a similar state to that of uterus; vessels blocked up with fibrine; uterus and right ovary together weighed 9½ ounces. Mucous membrane of intestines healthy.

Case 504.—Washerwoman, work-house, aged 74 years. Peritonitis, complicated with an ulcer perforating the stomach. Felt a pain at the epigastrium for two weeks previous to admission. This did not, however, prevent her following her occupation till within four days of admission. She died in two days after. When admitted there was tympanitis and tenderness of abdomen on pressure; tongue dry, with a brown fur; no vomiting.

Head.—Brain natural.

Chest.—Chronic bronchitis; right lung, 19½ ounces; left, 17½ ounces. Heart, 9 ounces.

Abdomen.—Bowels tympanitic, convex surface of liver, and the arch of the colon coated with false membrane; liver large, 54 ounces; its under surface dark-coloured, especially the left lobe, which was soft, almost in a gangrenous state; upon raising this lobe it was found to conceal an opening into stomach, sufficiently large to admit two fingers; none of the contents of stomach found in the abdomen. The opening in stomach was situated at the upper portion of lesser curvature about two inches from pylorus, and was found to have smooth rounded edges; other portions of stomach healthy; weight, 7 ounces. Kidneys small, 6 ounces.

Case 505.—Female, aged 45 years. Ascites, combined with anasarca and enlarged heart. Died in a chronic ward work-house.

Head.—Brain natural; weight, 46 ounces.

Chest.—Pleuritic adhesions of upper lobes lungs, and earthy deposits in

their apices; lower lobes congested and very dark-coloured; right, 28 ounces; left, 24 ounces. Heart greatly enlarged, 17 ounces.

Abdomen contained a considerable quantity of fluid; liver enlarged, 57 ounces; spleen enlarged, 12 ounces; kidneys, 9½; stomach, 9½ ounces; mucous membrane of intestines healthy; anasarca of the lower extremities.

Case 506.—Female child, aged 18 months. Ulceration of mucous follicles of large intestines, and diarrhoea complicated with scrofulous enlargements of mesenteric glands; fluid in the brain; pulmonary tubercles and pneumonia. Child died eleven days after admission, diarrhoea being the most distressing symptom; scrofula affecting several organs, and intestinal ulceration.

Head.—Lateral ventricles of brain contained about two ounces of clear fluid; softening of *septum lucidum* and fornix, the *venæ Galeni* distended with coagulated blood, each vein as large as a crow-quill.

Chest.—Apex of right lung had on its surface several white miliary tubercles, and the size of a French bean of firm scrofulous matter, with central softening in its substance; the surrounding portion of lung in first stage pneumonia. Left lung, the posterior third of its lower lobe coated with false membrane, also in first stage of pneumonia; much purulent matter in bronchial tubes of both lungs; right, 21 ounces; left, 2 ounces. Heart contained fibrine, 1 ounce. Scrofulous enlargement of the bronchial glands.

Abdomen.—General ulceration of the mucous follicles of colon and rectum; mesenteric glands enlarged, containing scrofulous matter; liver, 10 ounces.

Case 507.—Widow, aged 64 years. Ulceration of colon, complicated with diseased kidneys and chronic bronchitis. Diarrhoea existed for one month previous to admission, and was very little controlled by the use of opium or astringents, either vegetable or metallic. She died nine days after admission.

Head.—Brain natural; weight, 42 ounces.

Chest.—Slight pleuritic adhesions on both sides; congestion of lower lobe right lung (cadaveric) redness and apparent thickening of bronchial lining membrane; right, 21 ounces; left, 18 ounces.

Abdomen.—Ulceration of mucous membrane of colon; ulcers small and membrane red. Kidneys wasted and marbled on surface; capsules readily peeled off; cortical structure soft; weight, 6½ ounces. Liver, 37 ounces.

Case 508.—Male child, aged 2 years and 8 months. *Cholera spasmodica*, attributed to eating fruit; taken ill at midnight, brought to infirmary at 8 o'clock A. M., died at noon. In a state of collapse on admission; eyes sunken and dark around; extremities cold; vomiting and purging; cramp in lower limbs; vomiting did not recur after admission.

Head.—Brain large, healthy; weight, 45½ ounces.

Chest.—Thymus large, half-an ounce; organs healthy; right lung, 3½ ounces and 2 drachms; left, 3 ounces and 1 drachm. Heart, 27 ounces.

Abdomen.—Organs appeared natural; intestines rather pale-coloured, and contained some scybala. Liver, 14½ ounces.

Case 509.—Female infant, aged 5 months. Diarrhoea for three days previous to admission; the symptoms increased, it got in a state of collapse, cold extremities; eyes sunken, and died two days after admission. Mother died of puerperal peritonitis soon after its birth.

Head.—Brain natural.

Chest.—Organs natural.

Abdomen.—Mucous membrane of intestines nothing peculiar; mesenteric glands enlarged. Child weighed 7 pounds 4 ounces; length, 21 inches.

- **Case 810.**—Female infant, aged 18 months. Gastritis and enlarged mesenteric glands, Diarrhoea on admission; died in two days after.

Head.—Brain natural.

Chest.—Organs natural.

Abdomen.—Lining membrane of stomach of a florid red colour, the organ contracted to the size of a large intestine; mucous membrane of intestines pale. Intestines contained some chalky-looking matter, (probably the medicine;) no appearance of bile. Child weighed 9 pounds; height, 27 inches.

Case 811.—Married man, aged 68 years. Scirrhus pylorus complicated with pneumonia; for a long time in bad health; a sallow sunken countenance; body much emaciated. Two days previous to admission suffered from almost constant vomiting, which continued until within four days of his death; bowels nearly the whole of the time being obstinately constive, which was relieved by injections; medicine was not retained by the stomach. He died 17 days after admission.

Head.—*Dura mater* adherent to skull; veins of the brain congested.

Chest.—Slight pleuritic adhesions of old standing; posterior portions of upper lobes of both lungs in second stage of pneumonia; posterior portions of lower lobes congested, and portion of right in first stage pneumonia; right, 38 ounces; left, 28½ ounces. Heart, 8 ounces.

Abdomen.—Liver large, 52 ounces; coats of gall-bladder thickened; it contained three light-coloured gall-stones; kidneys large, congested, 12 ounces; spleen small, 2 ounces; stomach, pyloric end very much thickened; scirrhus passage to duodenum very much smaller than usual, nearly blocked up; a portion of small intestines had anormal adhesions to the omentum.

Case 812.—Female, aged 74 years. Brought in for interment; no history. Cancer of stomach and gangrene of opposite surface of liver.

Head.—Fluid on surface of brain, and about half-an ounce in the lateral ventricles.

Chest.—Emphysema of lungs, and apparent dilatation of bronchial tubes; right, 11½ ounces; left, 10½ ounces. Heart, 8 ounces.

Abdomen.—Left lobe of liver adhering to lesser arch of stomach, the size of a crown piece of its under surface in a gangrenous state; weight, 40 ounces. Peritoneal adhesions to the great end of stomach, its inner surface red; the entire of lesser curvature, an ulcerated cancerous mass; weight, 8½ ounces. A soft, almost gangrenous spot, size of a sixpence, on surface of left kidney. Intestines healthy; atheromatous degeneration in abdominal aorta.

Case 813.—Female, aged 79 years. Cancer of stomach complicated with pneumonia, a drunken virago; for one month before her admission to the infirmary was under medical treatment; she had almost constant vomiting after taking food, and became extremely emaciated; her face which was florid, became haggard and anxious; eyes sunken, and forehead bedewed with cold clammy perspiration. Death occurred ten days after admission.

Head.—Scalp adherent to skull; an extensive cicatrix from an injury of old standing; no internal marks of violence; brain natural, weight 47½ ounces.

Chest.—No pleuritic adhesions; lower lobe and posterior portion of right lung red, and structure soft; lower lobe left lung engorged with thin red fluid; right 24 ounces; left 15 ounces. Heart small, 5 ounces.

Abdomen.—A cancerous mass size of a hen's egg, encircling the pyloric orifice of stomach; and one of a similar size, like a clot of blood, in the interior; stomach weighed 7 ounces; intestines healthy; liver 46 ounces; Bright's disease of kidneys, best marked in the left; kidneys weighed 9 ounces; a dropsical cyst size of an orange, attached to right ovary; peritoneum adherent to its surface; uterus healthy 1½ ounce.

Case 514.—Female aged 61 years. Cancer of stomach, and fracture of neck of left femur. Died in chronic ward work-house.

Head.—Brain natural.

Chest.—Structure of the posterior portion of lower lobes both lungs softened; right, 11 ounces; left, 12 ounces. Heart small, $8\frac{1}{2}$ ounces, contained fibrine.

Abdomen.—About three-fourths of the stomach had its parietes in a thickened scirrhus state, weighed $6\frac{1}{2}$ ounces; liver small, 32 ounces; kidneys small, $8\frac{1}{2}$ ounces; uterus healthy, 1 ounce; mucous membrane of intestines dark-coloured.

Case 515.—Female infant, aged 14 days. Icterus; body emaciated, of a deep-yellow hue, as well as the tissues generally. Brought in for interment; no history.

Head.—Membranes of brain of a yellow colour.

Chest.—Thymus yellow, small, 1 scruple; lungs of a yellow colour; right, three quarters of an ounce; left, half an ounce.

Abdomen.—Liver of a dark-green colour; no obstruction in cystic duct; weight, 3 ounces. Infant appeared to have been born about the eighth month; weight of body, 2 pounds 14 ounces; length, 16 inches. Vide Mr Gulliver's Notes on the state of the cells in diseased Liver.

Case 516.—Porter, single, aged 35 years. Granular kidneys, and anasarca, complicated with ulceration and inflammation of colon; peritonitis and pulmonary disease; he was obliged to use crutches from a comminuted fracture of left leg and foot, a caak of tallow having crushed it, five years since; very pale, and suffering from debility on admission; anasarca of the lower extremities and scrotum; pain in the loins; the size of legs, &c. diminished while using diuretics; subject to nausea, occasionally this symptom was not present for the last month of his illness; about three weeks before his death, pain was felt in lower part of abdomen, and subsequently diarrhoea, both the symptoms continued unabated till his death, which occurred more than two months after his admission to the infirmary.

Head.—Brain pale, and structure rather soft; weight $52\frac{1}{2}$ ounces.

Chest.—Old pleuritic adhesions on both sides; emphysema of lungs; congestion and cedema of lower lobe, and posterior portion of upper lobe of right; cedema of portion of lower lobe left also; right weighed, 26 ounces; left, $19\frac{1}{2}$ ounces. Heart flabby; cavities dilated; weight, 10 ounces.

Abdomen.—Liver dark-coloured, $52\frac{1}{2}$ ounces; kidneys twice the usual size; capsules readily separated; cortical structure almost white; surface granular, approaching to a tubercular state; structure very firm; right kidney weighed, $8\frac{1}{2}$ ounces; left kidney, $9\frac{1}{2}$ ounces; renal capsules the usual size; weight, half an ounce; stomach thickening of its tunics, as well as that of the whole of intestinal tube; a coating of false membrane at irregular intervals on the mucous membrane of colon, commencing a little below cæcum, interspersed with small round ulcers, which appeared to be of long standing.

Case 517.—Female child, aged 2 years. Obstruction to excretion of urine; distended bladder, ureters, pelvis, and infundibula of kidneys; child cachectical; abdomen tumid; she died ten days after admission to the infirmary. Nurse stated that the child passed water in the usual way.

Head.—Brain appeared natural; weight, 30 ounces.

Chest.—Organs natural.

Abdomen.—Bladder distended, reaching to umbilicus; ureters also distended; bladder was taken out and separated from vagina about its centre; the cause of the distension was not discovered; pelvis and infundibula of each kidney distended; a cyst as large as an orange, and filled with straw-coloured fluid, connected with the fibrous capsule of right kidney.

Case 518.—Charwoman, aged 67 years. Cancer of vagina and bladder, &c. Incontinence of urine; scalding and pain for five weeks previous to

admission ; died in two months after admission ; seemed to be in constant pain, unless when under the influence of opiates ; feces and urine passed involuntarily. She sunk gradually and died in a most emaciated state.

Head.—A more than usual quantity of fluid in brain.

Chest.—Some congestion (cadaveric ?) of lower lobe right lung ; mucopurulent matter in bronchial tubes ; right, 16 ounces ; left, 10 ounces. Heart 8 ounces.

Abdomen.—Vagina and inner surface of bladder one mass of soft cancer and gangrene ; the disease had not involved the uterus ; weight of uterus, 2 ounces 1 drachm.

Among the foregoing cases, two males and seven females were affected with peritonitis ; three of the latter were puerperal women, and in case 501, there was an abscess in the substance of the uterus. One female affected with ascites ; one male child with cholera ; four females with diarrhoea, and ulceration of the bowels ; one male and three females with cancer ; one female icterus ; one male and two females diseased kidneys and bladder.

TABLE F, showing the age, sex, and number in each quarter, for years 1840, 1841, and 1842, of 182 cases of abdominal diseases, including the diseases of the digestive and genito-urinary organs.

Ages.	Yrs.	1st Quarter.		2d Qr.		3d Quarter.		4th Quarter.		Tot.	
		Males.	Females.	M.	F.	M.	F.	Males.	Females.	M	F.
Under 3 years.	1840	1 S	1 S			2 D	2 S		1 X	3	4
	1841	1 S	1 D				1 K			4	2
	1842	2 S & D	2 L	1 A	1 K		2 S, D	3 S, A, E	2 D, L	3	7
	Tot.	4	4	1	1	2	3	3	3	10	13
From 3 to 7 years.	1840										
	1841								1 S		1
	1842	3 G & E	1 E			1 Cho			1 K	4	2
	Tot.										
7 to 10.	1840	3	1			1			2	4	3
	1841	1 A								1	
	1842								1 P		1
	Tot.										
10 to 15.	1840	1							1	1	1
	1841			1 S						1	
	1842								1 P		1
	Tot.										
15 to 20.	1840			1					1	1	1
	1841								1 P		1
	1842	1 C								1	
	Tot.										
20 to 30.	1840	1							1	1	1
	1841	1 E	1 D		1 H					1	2
	1842			1 I	1 C		1 C	1 A	1 K	2	3
	1842	1 E			2 P		1 M		1 P	1	4
	Tot.	2	1		4		2	1	2	4	9

Ages.	Yrs.	1st Quarter.		2d Qr.		3d Quarter.		4th Quarter.		Tot.	
		Males.	Females.	M.	F.	M.	F.	Males.	Females.	M	F.
10 to 40.	1840	2 H K	1 P	1 K	1 C				1 H	3	3
	1841				1 C				1 I		2
	1842					1 E			1 P	1	1
	Tot.	2	1	1	2	1				4	6
10 to 50.	1840			1 P	1 E	1 T	2 K H	4 T A	3 I A	6	4
	1841		3 P E A	1 D		1 C	1 E	4 R H	1 C	2	5
	1842		1 C			1 P	1 A			1	2
	Tot.										
10 to 60.	1840		4 C	2	1	3	4	4	2	9	11
	1841	1 A	1 L		1 C	1 B	1 C	1 C	1 K	3	4
	1842		2 C L								2
	Tot.										
10 to 70.	1840	1	5		1	1	1	1	1	3	8
	1841	1 E	2 R C				1 P		3 K L C	4	6
	1842	1 L	1 K		1 C		1 E	3 C E A	1 E	2	3
	Tot.					1 C	2 C D				
70 to 80.	1840	2	3		1	1	4	3	4	6	12
	1841	1 A	1 K	1 C		2 E B	1 E	2 L C		5	1
	1842	1 E	1 P		1 E	2 P D	1 D	1 P	1 C	4	3
	Tot.						1 P		2 C	1	5
80 to 90.	1840	2	2	1	1	4	3	3	3	10	9
	1841					1 B	1 C			1	1
	1842				1 L				1 C		2
	Tot.										
90 to 102.	1840				1	1	1		1	1	3
	1841										
	1842		1 K								1
	Tot.		1								1
Gross	Tot.	18	23	7	12	14	20	15	24	54	78

As the above table includes a variety of diseases, letters have been affixed to the figures, for the purpose of indicating the nature of the disease more exactly; thus A, ascites, of which there has been 11 cases; B, bladder and urethra, three cases; C, cancer, 27 cases, including that of uterus, as well as stomach and intestines; cho, cholera, one case; D, diarrhoea 11; E, enteritis and ulceration of the bowels, 18 cases; G, gangrene, one case; H, hæmorrhage, hæmatemesis, as well as uterine hæmorrhage, five cases; I, ileus, two cases; K, diseases of kidneys, 12; L, diseases of liver, nine cases; M, metritis, one case; P, peritonitis, 16 cases including five puerperal; R, rupture (hernia) two cases; S, scrofula, 10 cases, the majority enlarged mesenteric glands in young children; T, two cases poisoning from oxalic acid; X, imperforate anus.

Cancer has been the most frequent of these diseases, especially

amongst women after 50 years; 22 cases occurred in this class, and five among the males. The heart was remarked usually to be smaller in persons affected with cancer than in other diseases, and the body more emaciated.

Age.—The largest number of deaths from disease of the abdominal organs occurred in infants under two years, of which there were 23, principally in consequence of depraved nutrition, scrofula, in the form of *tabes mesenterica* and diarrhoea.

During the following five years, (in children from two to seven years,) there were seven cases; in the next three periods, from seven to 20, including 13 years, there were but five cases. In 20 years, from 20 to 40 years, there were 23 cases, principally of enteritis, peritonitis, puerperal cases. In 10 years, from 40 to 50, there were 20 cases examined; and the next ten years, from 50 to 60, only 11 cases. The following 20 years, from 60 to 80, there were 37 cases, the numbers in each period of ten years being nearly equal. From 80 to 90 years, there were four cases; an old female, at the advanced age of 102 years.

Sex.—Fifty-nine per cent. were females, and 41 per cent. males. The difference was greater in favour of females from 20 to 30 years, and again from 50 to 70 years; the difference was still (although less) in their favour, from 30 to 50 years.

Season.—The cases were most numerous in the first and fourth quarters, and least in the second quarter; thus, first quarter, 30 per cent.; second quarter, $14\frac{1}{2}$ per cent.; third quarter, nearly 25 per cent.; fourth quarter, $29\frac{1}{2}$ per cent.

Proportion of the above for each of the three years was, 1840, males, 21; females, 24; total, 45;—1841, males 19; females, 23; total, 42;—1842, males, 14; females, 31; total, 45. Thus, the numbers in these years have been nearly alike, for the diseases of the abdominal organs.

Notes on Morbid Parts from Dr Boyd's Cases. By GEORGE GULLIVER, F. R. S.

A detailed account of each case would occupy so much room, that a few summary notes will be given only on such points as may appear best deserving of attention.

Some of the chemical observations will be regarded with interest, when it is known that they were made by Dr Davy, to whom portions of the morbid parts were sent for examination; and I have to express a grateful sense of the kindness with which he has always been ready to help me in arriving at a precise knowledge of various obscure animal matters.

When the colour of microscopic objects is mentioned, it is to be understood, unless otherwise expressed, as seen by transmitted day-light; the measurements are always given in vulgar fractions of an English inch. Though the phrase exudation corpuscle has been so commonly employed by authors, it is in some respects so objectionable, that it should be considered merely as provisional; in which way it is used here, and without intending to convey any idea as to the origin or formation of the corpuscles.

BRAIN.

Yellow or rusty-coloured matter in the site of old apoplectic effusions,—

was found to contain oily molecules and granular corpuscles, in a matrix of fine granular matter, and shapeless yellow fragments. Dr Davy found the colouring matter to be peroxide of iron.

Yellow matter in the pia mater.—In two cases, in which old apoplectic cells existed in the brain, microscopic granular masses, of a deep-yellow colour, were clearly seen in some parts of the *pia mater*, although the membrane had only a diffused yellowish appearance to the naked eye. The yellow matter seemed to be the peroxide of iron. In one of these cases, the *pia mater* was studded with microscopic crystals of an intense orange colour.

Old blood clots in the cerebrum.—Two were carefully examined. They had a dull red colour towards the centre, brownish nearer the surface, and yellow at the circumference. They contained a great quantity of minute molecules, larger oily globules, and granular corpuscles. Bits of the clots dried by heat on paper gave it a greasy stain. The yellow matter was peroxide of iron. Dr Davy examined one of the clots, and found that it contained fatty matter, chiefly olein. The molecules and granular corpuscles, he concluded to be, at least in part, composed of olein; and in the lower portion of the clot he found yellow colouring matter consisting of peroxide of iron.

LUNGS.

The inflamed lungs were not more commonly of a red or ruddy colour, than of a brown or leaden hue. The latter variety sometimes inclined to a slate tint. Whether the brown consolidation be or be not a chronic stage of the red,* the two kinds were found to differ in more respects than in colour. They were often more or less blended together; and occasionally existed distinctly in different parts of the same lung. The brown variety, though most commonly seen in old cases of phthisia, was repeatedly present in lungs quite free from tubercle.

Minute Molecules.—Smooth, circular, oil-like particles, varying in diameter from $\frac{1}{1000}$ th to $\frac{1}{500}$ th of an English inch; pellucid and nearly colourless when examined singly, yet generally paler and brighter in red than in brown pulmonary consolidation. The molecules were especially abundant in the early stages of pneumonia, and usually rather plentiful at every period of the disease. The molecules seem to be analogous to the elementary granules of Henle.†

Pale Exudation Corpuscles,—commonly about $\frac{1}{1000}$ th of an inch in diameter, but varying from $\frac{1}{2000}$ th to $\frac{1}{500}$ th, were the chief objects observed in red pneumonia. They generally resembled the corpuscles of fibrinous exudations; were more or less globular, not so frequently oval; pale or nearly colourless; semitransparent; and less distinctly granulated than the dark exudation corpuscles. A great many of the pale corpuscles often presented all the characters of pus globules, but this was seldom the case with the majority. Although the pale corpuscles usually contained merely minute molecules and very fine granular matter, the larger cells sometimes inclosed others which had still smaller nuclei. The pale exudation corpuscles appear to be allied to the elementary cells of Henle.‡

Dark Exudation Corpuscles.—They appeared of a dull brown colour, nearly opaque, as frequently oval as globular, often shapeless, commonly $\frac{1}{1000}$ th of an inch in diameter, but almost always varying from $\frac{1}{2000}$ th to $\frac{1}{500}$ th. Their dark appearance may arise from their opacity, as they may sometimes be seen to be whitish by reflected light. They were most distinctly granulated, being made up of molecules, sometimes with larger oil glo-

* Dr Williams observes that the colour of the inflamed part in chronic pneumonia, varies from a dark dingy red, to different lighter shades of reddish brown or buff.—On the Diseases of the Chest, 4th edition, London, 1840, p. 143.

† Anatomie Generale, par Jourdan, p. 161. ‡ Loc. cit p. 150 et seq.

bules; had occasionally a nucleus, though generally not; were as frequently without as with an envelope; and when this existed, it generally formed a smaller proportion of the corpuscle than the cell-wall of the pale exudation globule. A quantity of very minutely granular matter was now and then seen in the dark exudation corpuscles. Sometimes the envelope was but partially full of the molecules, sometimes it was full to bursting. The dark exudation corpuscles are similar to the objects described by Gluge* and Bennett† in softened brain, and by Dr Henderson‡ in pneumonia; and to the aggregation or granular corpuscles of Gerber.§

The dark exudation corpuscles were the chief and characteristic compound particles observed in brown consolidation of lung, just as the pale exudation corpuscles were the principal objects in red consolidation. But the two kinds of corpuscles were frequently seen together, especially in those parts of the inflamed lung which were of a brownish hue; and in some old cases of phthisis, molecules and the dark corpuscles were found rather plentifully in portions of the lung not in the least consolidated, but rather emphysematous, yet of a dull-brown or lead colour.

Fatty Globules,—larger than the molecules, were very commonly noticed in every variety of pneumonia and pulmonary gangrene. The fatty matter was especially abundant in the brown consolidation occurring in phthisis. The fatty globules were usually isolated, often irregular in shape, or drawn out by adhesion to the object plate, as if semifluid and quite destitute of any envelope. They were sometimes aggregated, with or without a matrix of minutely granular matter; occasionally they were attached to or contained in a flat inmembranous fragment like an epithelial cell; and it was not unusual to see them clustered within a dark exudation corpuscle.

Shining corpuscles, concentrically striated,—rounded, lenticular, or oval; margins smooth, sometimes undulating, the stripes running parallel to the circumference; generally single, but occasionally including one, two, or three bodies, more or less similar to the shell; diameter very variable, though commonly about $\frac{1}{100}$ th of an inch. These are probably identical with the lenticular spheres figured by Gruby|| in the expectorated matter of phthisical patients. The striated corpuscles were occasionally observed in red pneumonia, unaccompanied by tubercular disease, and very commonly in brown pneumonia, especially in old cases of phthisis. The striated corpuscles sometimes occur in other diseases, and even where no disease is suspected. I have observed them in the thymus body.

Smooth pale Globules,—of different sizes, but usually about $\frac{1}{100}$ th of an inch in diameter, were frequently seen in red pneumonia. They were less commonly found in brown pneumonia. They are very delicate, soft, and fugitive; are destroyed by vegetable acids, and by water.

Colouring Matter.—Shapeless fragments of a bright-yellow, sometimes of a deep-orange colour, were often seen in red pneumonia. Their appearance was granular, obscurely crystalline, laminated, or rounded, and their colour was rendered more distinct by acetic acid. In the bronchial tubes of a still-born child, yellowish green matter was found in great abundance, which had exactly the same characters under the microscope, as meconium from the same child. The pulmonary parenchyma of this child had a healthy appearance, till examined microscopically, when the greenish matter was observed in considerable quantity. The black pigment of the lungs was, as usual, generally observed in irregular shapeless masses, composed merely of a congeries of extremely minute circular particles; but in many

* Prov. Med. Journ. No 113, and Ostr. Med. Woch. January 22, 1842.

† Edin. Med. and Surg. Journ. Nos. 153 and 155.

‡ Lond. and Edin. Monthly Journ. October 1841.

§ General Anatomy, Atlas, p. 5.

|| See Dr Goodfellows' Translation, *Microscopic Journal*, September 1842 to January 1843, plate 6, figs. 89-95.

cases these particles were contained in distinct rounded cells, about $\frac{1}{16}$ of an inch in diameter, the intensely black contents contrasting strongly with the pale semitransparent cell-wall. In many cases, rounded masses of the black matter existed without any envelope; and occasionally a similar mass had about a third or fourth of its circumference occupied by a pale crescentic body, which sometimes appeared to be an imperfect cell-wall; and sometimes a smooth and rounded nucleus only partially covered by the pigmentary granules.

Tubercle.—The precise seat of pulmonary tubercle was often within the air-cells; * and occasionally also in the filamentous tissue between them. In a child aged eleven months the lungs were studded with small miliary tubercles, a careful examination of which showed the tubercular matter partly filling the interior of the air-cells, and partly the tissue situated exterior to them.

Chemical Observations.—Dr Davy frequently examined the minute molecules, and found them to be chiefly composed of olein. In a recent examination of the pale exudation globules, he concluded that the cell-wall was in great part formed by margarine, and the included molecules of olein. In the brown exudation corpuscles he found a considerable quantity of olein and some margarine.†

Although acetic acid, strong or dilute, often exerts no evident action on the juice of pneumonia, yet it is remarkable that this acid sometimes produces a tolerably copious precipitate or clot in the juice. Occasionally this clot is tenacious, and presents even a fibrous appearance when examined by the microscope. The same observations apply to the action of acetic acid on purulent matters.‡

A portion of lung (Dr Boyd's case 490) in which the black pigment was remarkably abundant, was examined by Dr Davy, who found that the colouring matter differed chiefly from soot in containing a little peroxide of iron, i. e. the black pulmonary matter yielded the oxide on incineration.

LIVER.

Jaundiced Cells.—A woman, aged 35, had many of the tissues jaundiced. The cells of the liver were surcharged with greenish yellow biliary matter, so as to contrast remarkably with the cells of the healthy liver. A like case occurred in a child, of which the notes made at the time will be subjoined, as the subject is interesting in relation to the question of the ultimate secreting structure.§ October 14, 1842: Dr Boyd's case 515; a female fourteen days old; received part of liver, aorta, and costal cartilages, all of which were of a deep yellow colour. Cells of the liver intensely yellow under the microscope, whether viewed by reflected or transmitted light; the greater part of the colouring matter granular, or in minute shapeless fragments; some of it apparently fluid, especially near the edges of the cells; the granular part chiefly collected around the nucleus, though also irregularly scattered throughout the cell. Some of the cells, excepting a part near to the circumference, were rendered opaque by the accumulated colouring matter within them. Cells from the healthy liver of a child, aged three years, examined at the same time for comparison, afforded a striking contrast, as they were destitute of the colouring matter around the nucleus, were throughout of a light brownish colour, and nearly

* See Willis's Translation of Wagner's Physiology, part 2, p. 360, fig. 175.

† On this subject see Henle, L. c. p. 162 and 118; Acherson, Paget's Report p. 7; Bennett, Edin. Med. and Surg. Journ. No. 155.

‡ See Dr Guterbock's account of Pyine, De pure et Granulatione, Berol. 1837; and Dr Davy's Researches, Phys. and Anat. Vol. ii. p. 475.

§ See Goodsir on the Ultimate Secreting Structure, Trans. Royal Soc. Edin. Vol. xv.; Carpenter on the Origin and Functions of Cells, p. 23, from Brit. and For. Med. Rev. No. 29; Henle, Anatomie Generale, par Jourdan, p. 211.

transparent. Some cells from the healthy liver of a woman, aged 90, presented a similar contrast to the jaundiced cells.

Waxy-looking Liver.—Some portions from two cases were nearly of the colour of crude bees-wax, and stiff or tenacious in texture. These characters appeared to be owing to an unusual accumulation in the liver of viscid biliary matter, with a large proportion of mucus. In neither case did the organ contain more fatty matter than in the healthy state.

KIDNEYS.

Lithic acid in the tubules.—A female child, born prematurely, died nine days afterwards. The cut surface of the mammillæ of the kidneys presented a multitude of streaks, from distension of the tubules with a reddish-brown solid matter, which Dr Davy ascertained to be either lithic acid or lithate of ammonia, most probably the former.

Yellow matter.—In the substance of the medullary and cortical part of the same kidneys there were numerous very distinct microscopic particles of a very bright yellow colour. They had a granular appearance, were quite plain after several days maceration in water, and not affected by acetic acid. The quantity of the yellow matter was not sufficient to enable Dr Davy to ascertain its nature; but he agreed with me that it was different from the contents of the tubules.

Fatty matter.—The kidneys of a woman, aged 37, who died of chronic arachnitis, had a great number of white specks on the surface, and imbedded in the cortical part, very plain to the naked eye, though generally only from $\frac{1}{16}$ th to $\frac{1}{8}$ th of an inch in diameter. The specks were made up of a congeries of fatty globules, very characteristic under the microscope. In the kidneys, said to be affected with Bright's disease, from a woman, aged 68, there were in the juice a multitude of fatty globules and a few small pearly crystalline plates. Dr Davy extracted a little margarine, cholesterine, and a trace of olein from a fragment of one of the kidneys.

Cysts containing Margarine, Olein, and Yellow Granular Corpuscles.—In the cortical part of the kidneys of a man aged 55, who died of phthisis, there were several round or oval cysts, about a third of an inch in diameter, some of which contained a limpid yellow fluid, and others a pulpy matter of the same colour. In some of the cysts this substance was tolerably stiff, resembling the meliceris and atheroma of authors. In the fluid were many round granular corpuscles, of an intense yellow colour, mostly with envelopes, and of very different sizes, but generally about $\frac{1}{16}$ th of an inch in diameter. There were also numerous pale, fatty globules, often aggregated into clumps. In the pulpy and stiffer substance the fatty matter was so abundant as to render thick paper transparent when dried on it by heat.

Cysts containing Cholesterine, and Pale Granular Corpuscles.—In the preceding instances the fatty matter was chiefly margarine and olein; in two other cases the fatty substance was nearly all cholesterine. There were cysts filled with a limpid fluid, and imbedded in the surface of the kidneys. Each cyst was about the size of a pea. A great quantity of plates of cholesterine were found, principally sticking to the walls of the cysts. The fluid also contained many pale, round, nearly transparent, and minutely granular corpuscles, generally about $\frac{1}{16}$ th of an inch in diameter. The kidneys were otherwise healthy.

TESTICLES.

After middle life the seminal tubes were often more or less obstructed with molecules, generally aggregated into irregular masses, nearly opaque, either of a dull-brown, yellowish, or lead colour. Occasionally they were aggregated into oval or round corpuscles, mostly destitute of an envelope; and they were not unfrequently seen within bodies which were probably the seminal cells. This state of the tubes was almost always found in old subjects; it was by no means rare before 30 in persons who

had died of lingering diseases; and was generally coincident with a fewness or total absence of the spermatozoa.* Larger oil globules were sometimes seen within the tubes. There is reason to believe that the molecules contain a large proportion of olein.

BLACK PIGMENT IN THE INTESTINAL MUCOUS MEMBRANE.

Sometimes there were black specks, sometimes a diffused brown or black colour, of the mucous membrane of the large intestine.† The affection was most frequently observed in the rectum, especially in elderly people.

The pigmentary granules were occasionally observed in rounded cells; but the black matter, like that of the lungs and bronchial glands, had generally no appearance of a special apparatus, but was scattered in shapeless masses, and had just the same chemical characters as the black pigment of the lungs.

ARTERIES.

Fatty degeneration.—This very commonly existed in the substance of the inner and middle membranes, often between them, and sometimes in the outer coat. Though most common in old age, it was twice seen in subjects not past 21, and once in a boy of 16. Even in the early stage of the disease, the fatty matter was easily recognizable in the well-known opaque whitish spots, or thickened parts of the inner tunic of the vessel. The disease was observed in the aorta and its valves, in the cerebral arteries, in the iliac and femoral arteries. In a man who died of apoplexy, the coats of the arteries of the brain, even of the smallest branches, were studded with, and made fragile by, fatty patches. I have elsewhere described the disease and the nature of the fatty matter.‡

Black Pigment.—Black and brown specks and patches were sometimes observed in the large arteries. This was caused by black pigmentary granules, in greater or less quantity, without any evident cells; generally confined to the inner membrane, but extending in one instance to the middle coat, and sometimes situated between these tunics. The pigment had the same chemical characters as that of the lungs. This discoloration of the arteries was observed where the inner tunic had become partially broken and detached near to old fatty and bony deposits.

SOFTENED FIBRINE.

Several specimens from the veins were examined. The central pulpy part of the clot was found to consist chiefly of granular matter and minute molecules; larger fatty globules, and shrunken cells. Sometimes still larger compound granular corpuscles were also observed, either encysted and more or less opaque, or naked and appearing like a congeries of minute oil globules. Occasionally there were corpuscles resembling those of purulent matter; but the bulk of the softened fibrine was still granular matter, the corpuscles being much less abundant than in regular pus. The pus-like corpuscles of the fibrine were not enlarged by water; some of them were not much affected by acetic acid; others had the cell wall rendered fainter or nearly invisible by the acid, so as to expose nuclei resembling those of the pus globule.§ Around

* See a case of the seminal tubes of a bear obstructed by fatty matter, in my *Observations on the Semen and Seminal Tubes*.—Proc. Zool. Soc. of London, July 26th 1842.

† See Dr Hodgkin's *Observations on Colour*.—Lectures on Morbid Anatomy, Vol. I. p. 297, et seq.

‡ In a paper read at the Royal Medico-Chirurgical Society, February 28, 1843.—Abstract in London and Edinburgh Monthly Journal, No. 28.

§ As to the action of this acid, see Dr Bennett's *Observations*.—Microscopic Journal, January, 1843; and Gerber's *Anatomy*, note, p. 95, fig. 258.

the fluid or pulpy part, where the fibrine was tolerably firm, but had begun to soften, corpuscles of the character just-mentioned were commonly abundant, often with an intervening tissue of very delicate fibrils, and the corpuscles were especially numerous in clots of a buff colour, opaque, with an appearance of commencing diffuence, although nowhere broken down or fluid. These clots were most commonly noticed in the heart; and they would sometimes form a viscid ropy compound, as is generally the case with fresh primary cells, when triturated with concentrated solutions of alkaline or earthy salts, or of pure alkalies.

ART. VII.—On the Vegetable Resources of the Edinburgh Pharmacopœia. By SAMUEL THOMSON, M. D., Author of the Companion to the Pharmacopœia.

THE number of all the remedial agents enumerated in the alphabetical list of the Edinburgh Pharmacopœia is 341. A few of these are of animal production, a great many of mineral, but the majority of the whole is from the vegetable kingdom, which furnishes 206. The bodies derived from this prolific department of nature are highly interesting and valuable, for they have great variety of use, and extremes of power. They afford, indeed, almost every species of therapeutic agent that is reasonably believed to exist, and they may so easily arrange themselves into sixteen important classes, that each group will be not only effectively, but numerously constituted. The numbers of the individuals assignable to each class are as follows :

I. Astringents, 9.	IX. Refrigerants, 3+1.
II. Tonics, 63.	X. Anthelmintics, 3+11.
III. Antispasmodics, 26.	XI. Emmenagogues, 2+6.
IV. Cathartics, 30+1.	XII. Sialagogues, 1+6.
V. Diaphoretics, 7+2.	XIII. Errhines, 0+6.
VI. Emetics, 2+2.	XIV. Demulcents, 20+1.
VII. Expectorants, 9+7.	XV. Irritants, 8+16.
VIII. Diuretics, 11+9.	XVI. Colours and Tests, 4+2.

The figures joined to any particular class, with the sign plus, indicate the members it borrows from preceding groups. Thus black hellebore, one of the antispasmodics, being also of cathartic application, may be considered as adding to the strength of the fourth class. Several of the sets of agents are much indebted to this kind of reinforcement; yet, except the unimportant class of the errhines, they may all be independently completed.

I. That of the **ASTRINGENTS** includes catechu, galls, pomegranate-bark, logwood, kino, rhatany-root, oak-bark, red-rose, and tormentil. They contract, as it is believed, the living structures, and thus allay secretion and effusion. The principle to which they owe their power and styptic taste is tannin, or tannic acid, accompanied in some by another astringent acid, the gallic.

II. The **TONICS** derive their name from the verb *trahere*, to stretch or make tight; but the medical meaning may more readily be

perceived in the adjectives, *aromæ* and *suræ*, coming from the same source. The former signifies lax, languid, and weak; the latter tense, brisk, and strong. These are, therefore, bodies to be included among the tonics, which, in acting against *resolutio nervorum*, or paralysis, may produce the opposite evil of *distensio nervorum*, or tetanus. But the appellation strictly refers to an influence on the stomach, tending to brace its powers, and to bring it from torpidity to healthful excitement. This organ carries along with it the other viscera, the apparatus of the circulation, the nervous system, and the muscles; so that all those, in some of their derangements, may share the benefit of the ingestion of tonics. But these substances are so varied in kind, that we may readily distinguish them into seven orders, viz. aromatic, spicy, bitter, aromatic and bitter, astringent and bitter, narcotic, and narcotico-acrid. The astringents are allied to this class, and may, in several of their modes of operation, be viewed as tonics having an element that tastes of astringency, instead of aroma or bitterness. Indeed, a chemical relation between the two classes is seen in our fifth order, where the astringent and bitter principles are conjoined, to which we might have added some other names, but that we could not, on slight grounds, impoverish the catalogue of astringents.

1. *The Aromatic Tonics*.—Under this name we are to rank twenty, which are, dill, anise, orange-flower water, neroli oil, oil of bergamot, caraway, coriander, cumin, turmeric, fennel, lavender, oil of lemons, balm, peppermint, spearmint, marjoram, pennyroyal, attar of roses, rosemary, and elder-flowers. Their activity depends upon volatile oil, so that their effects are rapid and evanescent. Were it not that they relieve the distress of flatus, stop faintishness, and allay nausea and vomiting, they might be considered just so many flavouring agents, varying in taste and odour. The type of the order is peppermint, which is more in use than the rest put together. They are all very fragrant; and the oils, one or two excepted, consist of oxygen, besides carbon and hydrogen.

2. *The Spicy Tonics* are fourteen, viz. horse-radish, canella, capsicum, cardamom, clove, cassia-bark, cinnamon, cubebs, nutmeg, pimento, long-pepper, black-pepper, mustard, and ginger. They merit their name by a quality too well understood to require definition. The principle to which the most of them chiefly owe their virtue, is very similar to the active element of the preceding order; only it is of such a nature as to render their effects perhaps equally rapid, and certainly less evanescent. In horse-radish and mustard, it is an acrid and vesicating species of volatile oil, distinguished as containing sulphur, along with carbon, hydrogen, oxygen, and azote, for ultimate constituents. These two, indeed, are known to possess properties that warrant their being placed among the epispastic irritants. In cardamom, cassia-bark, cinna-

mon, and nutmeg, it is a volatile oil differing from the active principle of the aromatic tonics, in having less fragrance, and in possessing acrimony. In the rest, canella, capsicum, cloves, cubeba, pimento, long-pepper, black-pepper, and ginger, an oil of this kind is accompanied by an acrid resin, which not only contributes to the tonic effect, but renders it more permanent. The spicy tonics, therefore, though nearly related to the aromatic, are endowed with qualities sufficiently characteristic to establish a separate order. Their power of strongly and durably stimulating the circulatory apparatus, obviates their safety in inflammatory affections, and wherever there is a tendency to vascular excitement. Nutmeg, taken largely, is somewhat narcotic.

8. The *Bitter Tonics* amount to eleven, and are, wormwood, chamomile, calumba, centaury, chiretta, gentian, buckbean, quassia, sulphate of quina, simaruba, and dandelion. They owe their medicinal activity to the principle in which their bitterness resides. They exhibit little of the variety of flavour hitherto observed, for they are very sparingly endowed with volatile oil, and depend upon an element identical, as to taste at least, in all. The link, connecting these with the two former orders, lies in chamomile and wormwood, which contain much more oil than the rest. The bitter ingredient is chemically distinguished as an extractive, that is, a matter capable of being separated from its vegetable source, through solubility in water; and we take advantage of this property, in the case of gentian, quassia, chamomile, and dandelion, in order to employ their tonic agency in a concentrated form. It is not volatile, and, therefore, possesses no independent power of physical diffusion; neither is rapidity of medicinal action a character of the bodies that owe to it their efficacy, though they excel the preceding tonics in securing a permanent benefit. We do not comprehend the pathology of the change they produce in the nervous system of the stomach, when they improve its digestive functions; yet we have been taught, by long experience, to apply them to several of its derangements with confidence and certainty. But dyspepsia is not the only disease to which they give relief. Diarrhœa, dysentery, and other disorders of the alimentary canal, partake in the benefit of their use. In these, their action could easily be expected, for they approach as nearly to the intestines as to the stomach. When they influence distant organs, however, and attack the secret seat of fever, their operation is difficult to explain, unless we believe that their active matters are always absorbed, and carried on by the circulating fluids, which is contrary to demonstration. Probably the remote parts of the system are affected through a vital sympathy with the digestive apparatus, and the more readily when the advantage, gained upon this, is of the well sustained and powerful kind that the bitter tonics afford. The diseases alluded to are,—some mesenteric af-

fections; chronic inflammation and obstructions of the liver; gout, rheumatism, epilepsy, chorea, and hysteria; intermittent, and typhoid fevers. A trace of narcotic influence is exhibited by quassia and calumba.

4. The order of *Aromatic-and-bitter Tonics* comprehends the nine following: angelica, bitter orange rind, bucku, sweet flag, cascarilla, angustura-bark, lemon-peel, pareira, and Virginian snake-root. These not only possess much bitterness, but, with the exception of pareira, abound in volatile oil, so as to have the stimulant qualities of our first order. They are also imbued with resinous matter, and, especially bucku and pareira, determine to the urinary organs, which seems to be the peculiar property of many of the resins. In other points they differ little from the preceding order, and would nearly coincide with chamomile and wormwood, were not the oil of these two bodies of a nature to separate them from the aromatics. They counteract sickness; and as their ingestion is quickly followed by a carminative effect, and an improvement of the appetite, they are well adapted for dyspepsia, when it is attended with nausea, anorexia, and flatulence. They are beneficial in cholera, dysentery, and the diarrhoea of persons long tried in tropical climates, which is apt to assume a dysenteric character. The remoter affections ameliorated by their use, are, chronic hepatitis, rheumatic pains, nervous fevers, typhoid exanthemata, cystirrhoea, diseased prostate, and irritability of the bladder. Angustura-bark and cascarilla are exactly analogous to each other. Both are considerably hot, and by their approach to canella, which has some bitterness, form a link between this order and the spicy tonics; just as pareira, which has no aroma and little warmth, connects it with the bitter ones. Cissampelina, the intensely sweetish-bitter principle found in this body, is very like calumbin in some physical properties; yet we have been wont to associate other therapeutic ideas with pareira, than with calumba. Virginian snake-root, in its sensible qualities, has a near analogy to angelica; and this, again, touches upon the more purely aromatic tonics, some of which, as dill, pennyroyal, and balm, have a little bitterness under their aroma.

5. The order called the *Astringent-and-bitter Tonics*, consists of the cinchonas, with pyrola, willow-bark, and bearberry. They have plenty of bitter principle, and are generally well provided with tannin. The union of tonic and astringent power makes them very effective in diarrhoea and dysentery. But they are most celebrated for their use in ague, with which the idea of cinchona must ever be joined. Pyrola and bearberry, perhaps by their resin, an element, indeed, that is in all—are serviceable in various urinary diseases.

6. The *Narcotic Tonics*.—Narcotic, from the verb *ναρκαω*, to dull, implies a capacity very different to that which distinguishes

the bodies hitherto found in this class. The power of allaying excitement is chiefly imparted to the antispasmodics. But, that it is not, of necessity, far remote from tonic habitudes, nutmeg, quassia, and calumba demonstrate. They are links by which the two classes form, as it were, a ring—broken, indeed, and widely severed at one part, but continuous at every other. While quina and morphia aid the dialysis, these help the periphery. With them the bracing and the soothing qualities are in one principle; with hop, the only member of this order, they are in separate elements.

7. The *Narcotico-acrid Tonics*.—Above, we have seen the epithet acrid given to the essences of some tonics, and marking an intense flavour which seemed the earnest of great activity. The effect, however, falls so much short of the sense, that a dose, not to be endured in the mouth, may safely, and without pain, rest in the stomach; so that the guardian of this organ is sufficiently vigilant against them. But there are bodies that do not thus warn us from a hurtful ingestion, some rather concealing, under an ordinary sapidity, the keenest virulence; while others, equally deleterious, excite a gustatory sensation, only different in degree from that of the most innocuous medicines. All these are armed with a subtle and recondite power, not only to harass the corporeal actions, but to stupify the sensorium; and they are, therefore, called narcotico-acrid, a term employed in the history of poisons. Some of them may, under a careful eye, be directed to medical use; but we can only put one in the class of tonics, and this tends to the extreme tetanic effect mentioned in the general proem. It is *nux vomica*, from which its alkaleid *strychnia* need not be distinguished, though used in a separate state.

III. The *ANTISPASMODICS*.—Without philosophizing upon the mode of action, let it suffice to say, that this word is applied to a class of remedies, which are given to counteract spasm. Some of those to be here considered consummate their end without sinking the spirits, or obscuring perception; some induce irresistible drowsiness and insensibility; and some soothe one part of the frame, while they irritate another. These are three orders of antispasmodics, the operation of which is supposed to be conducted in different ways, because it is attended with different phenomena. In this they have a general agreement, that they not only resolve abnormal contractions of the muscles, but assuage the irritability of the nervous system, that is often symptomatic or premonitory of spasmodic derangements.

1. The *Carminative Antispasmodics* are these six: garlic, ammoniac, assafoetida, galbanum, valerian, and oil of cajuput. The name carminative was applied to bodies that were fit to be joined with charms and incantations. It is preserved by a set of agents

allied to several of the antispasmodics both in physical constitution and therapeutic tendency, the substances carrying their virtues in volatile oil, members of the first and second order of tonics. That which we chiefly intend by it, however, is a distinction for the part of the present class free of narcotic taint. The researches of Sir Charles Bell have brought to light two species of nerves subservient, one to motion, the other to sensation; and hence is a theory to explain the coincidence of tonics with these antispasmodics, as if they agree in acting upon the motor nerves, and in imparting stimulus in a condition of debility, the cause of the spasm they relieve. But let this speculation be right or wrong, the chemical analogy exists; and though some should therefore hesitate to put horse-radish and peppermint in a class opposite to that in which assafoetida and cajuput stand, there cannot be greater wonder in this volatile oil restoring flaccidity, and that firmness, to muscular tissues, than in one bitter principle inducing anorexia, and another promoting the appetite. The oil of this order is similar, either to that of the aromatic tonics in general, being constituted of C, H, and O, but of an odour more pungent, and much less agreeable, as in cajuput, and absolutely repulsive as in valerian; or to that of mustard and horse-radish among the spicy tonics, resolvable into S, C, H, O, and N, acrid, vesicating, and of great volatility, as in garlic and assafoetida. The remaining two, galbanum and ammoniac, are connected to assafoetida by botanical affinity, but chemically present a declining series by which we rapidly retire from it; for there is less oily essence, of whatsoever kind, in the former, and still less, if any, in the latter. Some disclose a resin to analysis, but little of their activity seems to dwell in it; and they all have an action as quick and transitory, as their main elements are diffusible.

2. The *Narcotic Antispasmodics* are, bitter almond, deadly nightshade, camphor, hemlock, henbane, lettuce-opium, cherry-laurel, poppy-heads, opium, and the acetate and muriate of morphia; eleven in all. The bodies here ranked as an order enjoy, in the systems of Cullen and Murray, the independent title of Narcotics. This term, however, which we have already analysed, seems better fitted to mark a subordinate quality, than give distinction to a class. It has no claim to be elevated above anodyne and hypnotic, other epithets applied to the same agents, the former from the noun *ἰσχυρῶς*, to indicate their power of removing pain, and the latter from the noun *ὑπνός*, to mark their capacity for putting to sleep. Further, the narcotic property is possessed by bodies too varied in therapeutic use, to come into one category, if we would construct a system to guide the student not only in his closet, but in his practice. The list authorized by the college includes many medicines of such a description, some employed as

tonics, some as cathartics, some as diaphoretics, some as diuretics, some as expectorants, and they are accordingly so arranged in this essay. But the greatest number are those that here stand as antispasmodics, which is their most obvious complexion in a practical view. The principles, in which their activity resides, were very little known before the advancement of chemistry. In general they are now well ascertained, though the analysis of a few is still imperfect. Bitterness and acridity is their common character as to taste; but, in hemlock and henbane, they are intensely acrid, and of a tobacco flavour. In bitter almond, cherry-laurel, and hemlock, they are liquid; in the rest, solid. They are odorous and volatile in the three just-named, together with camphor, henbane, and deadly nightshade. Chemically, they are oil, as in camphor; hydrocyanic acid, as in cherry-laurel and bitter almond; or alkaloids, as in the residue, if lettuce-opium prove not an exception. All have a powerful influence on the system, and render the agents possessing them of great medicinal value.

3. The *Narcotico-acrid Antispasmodics* are nine, viz. monkshood, cocculus-indicus, black hellebore, rue, cevadilla, stavesacre, tobacco, veratria, and white hellebore. Some of these cannot well be separated from the preceding order, but by the practical distinction, that they are employed with much less frequency and certainty, which is doubtless founded on experience of their unmanageable activity. Tobacco is the most allied to it, and is very akin to hemlock in constitution, depending upon an alkaloid of similar habitudes with conia. In rue, we might conceive an analogy to camphor, chemical rather than medicinal. The essence of black hellebore is probably also volatile; that of the rest is solid, bitter, fixed, and, except in cocculus-indicus, alkaline. All are very ill adapted for anodynes and hypnotics, and tend rather to irritate the system, if we may judge by the headach, nausea, diuresis, vomiting, purging, and tormina, that outstrip their narcotic influence.

IV. The *CATHARTICS* vary much both in the mode and the power of their action. Some operate very gently, and some with great violence; some excite the intestinal muscles alone, and some the exhalants also; some stimulate the *primæ viæ*, some the last portions of the canal, and some the whole intestines, with the adjacent viscera. In the following scheme, we endeavour to distinguish the different kinds; and in our imperfect views we have nearly followed Dr Murray's opinion of mild and drastic cathartics, but we further separate some under the name of dietetic laxatives, and add a fourth order, narcotico-acrid cathartics.

1. The *Dietetic Laxatives* may easily be selected under the nine names of figs, manna, olive oil, prunes, treacle, muscovado sugar, white sugar, tamarinds, and raisins. They are substances used in

food by some part or other of the human race, which, affecting the intestinal muscles, so as slightly to increase the natural peristaltic motions of the tube, thus promote the passage of the alimentary mass. In all, except olive oil, the active principle is saccharine matter, generally accompanied by malic, pectic, citric, or tartaric acid.

2. The *Mild Cathartics* are equally numerous, and are Barbadoes, East Indian, and Socotorine aloes, cassia-pulp, purging flax, rhubarb, castor oil, damask rose, and violet. These carry a sufficient definition in their name; for they are gentle, though effectual, in action; quicken the peristaltic movement with little effect on the exhalants; occasion but slight tormina, and are incapable of poisonous hypercatharsis. Their active principles are, for the most part, bitter; rhubarb, aloes, and purging flax being thus rendered tonic in minute doses. Aloes is singular in having its field of agency in the inferior intestines, while the rest of the order excite the superior; and hence it is improper in hæmorrhoids and other diseases of the rectum. Yet Dr Thomson (*Chem. of Organic Bodies*) is of opinion, that its action is reserved for the lower intestines by nothing else than improper modes of exhibition.

3. The *Drastic Cathartics* are ten in number, viz. the gamboge of Siam and Ceylon, colocynth, croton oil, elaterium, jalap, buckthorn, scammony, Alexandrian and Tinivelly senna. The certain efficacy that marks the operation of the cathartics of this order, gives rise to the title they often obtain, as if they were *κατ' ἐξοχήν δραστήνια*, eminently active. Their progress is so marked by griping and by forcible dejection, that we may conclude they urge the intestinal muscles much more than the preceding group. The liquidity of the discharge is evidence that they stimulate the serous exhalants, and mucous excretories; and justifies their appellation of hydragogue. Disgorged secretion of the pancreas contributes to the depleting tide, as well as the contents of the gall-bladder, and probably of remoter parts of the biliary system. Some of them, as elaterium and croton oil, act, even in minute quantities, with precipitate violence; and all, except perhaps senna, which is intermediate between this order and the last, would, if rashly ingested, lead to a fatal result, through a series of extreme sufferings in vomiting, purging, and tormina. Yet they are all found perfectly safe and manageable when used with a moderate degree of caution. By their cholagogue action they are well adapted for bilious remittent fever; and, by their hydragogue effect, for ascites, anasarca, and other dropsies. To chronic maladies and debilitated habits they ought ever to be applied with an intelligent circumspection, lest, as Dr Paris apprehends, we find too late that we have erred in an "unrelenting and blind routine."

by which we suffer the "elements of nutrition to be swept away from the *primæ viæ* before nature has had time to combine and absorb them." We may, indeed, readily perceive that an unhappy termination may be hurried on by the improper use of these cathartics, if we reflect how often, in fever and chronic ailments, diarrhoea spontaneously appears, as the minister and precursor of death. The principles in which their activity centres are various in kind, but all of an acrid nature, manifest in the pathology of their poisonous effects, though best exemplified by croton oil in its outward use as an irritant. Medicines of such a nature ought only to be given under a dilute form, being either suspended by a menstruum, or diffused through a quantity of powder. This will prevent their agency being restricted to one point of the alimentary surface, moderate their impetuosity, and insure the early exhaustion of their power.

4. The *Narcotico-acrid Cathartics* are euphorbium, oil of turpentine, and *black hellebore*. To purge is the property of almost all deleterious bodies, as well as of those included in the third order of the preceding class, though we only receive black hellebore from it, to add to the list of cathartics established by use. But a remedy capable of so vehement action is deservedly now seldom resorted to, and that only in the uncertain hope of anthelmintic or emmenagogue advantage. Euphorbium has also fallen into merited disuse, its extremely acrid energy being reserved for outward operation. On account of the irritation it produces in the Schneiderian membrane, it is in like manner named among the *errhines*, to point out its quality rather than its use, the classification of virulent substances, in accordance with their effects upon internal or delicate organs, being an important object of contemplation to the student of medicine. Oil of turpentine enters into this category with a milder character. However, in diuretic employment, for it is of diverse application, it often irritates the kidneys and bladder, so as to bring on ischuria and bloody urine.

V. Such *DIAPHORETICS* as we have here to consider effect their end by augmenting the force of the circulation, somewhat after the manner of the tonics of the first and second orders, which operate in no slight degree as sudorifics, when aided by external warmth and hot drinks, promotives indispensable even to the present class. There may, at the same time, be a peculiar action upon the stomach, an organ having an intimate sympathy with the functions of the skin, and in this way probably is caused an excitement of the cutaneous exhalants, or a relief of that constriction of their mouths, which is sometimes the obstacle to perspiration.

1. The *Non-narcotic Diaphoretics* are *lignum-vitæ*, *guaiac*,

mezeoreon, sarsaparilla, and sassafras. They have their virtue lodged in principles of an acrid and stimulating nature, most conspicuous in mezeoreon, which is well capacitated to be employed as an epispastic. So that if we except sarsaparilla, the blandest and least efficacious, they are all to be warily administered in high states of inflammation. Though they are destitute of anodyne power, their services are not to be overlooked in gout and kindred affections. Sassafras, by the volatile oil that carries its activity, is more nearly allied to the tonics than any other of the class.

2. The order of *Narcotic Diaphoretics* we have constituted of only *camphor* and *opium*, bodies derived from the second order of antispasmodics. Yet most of that valuable group, when given in small and repeated doses, tend to a general excitement of the system, in so much that they often not only produce a sustained intoxication in health, but support the powers of life against the depressing consequences of typhus and profuse hæmorrhage. Hence is their diaphoretic capacity, in which they probably sometimes act by relieving spasm of the exhalants, as well as by augmenting the vigour of the arteries. Their hypnotic power, an impediment to their success, appears to be counteracted by ipecacuan, tartar-emetic, and ammonia; and these are accordingly conjoined with them. But that their anodyne virtue is not thus altogether set aside, is evident in their influence upon gout, arthritis, and rheumatism, which cannot be fully explained, if we leave out of the account the specific opposition to pain.

3. The *Narcotico-acrid Diaphoretics* are an order which we have founded on the peculiar and well-known services of colchicum, to which we may derive two parallels from the third division of the antispasmodics, viz. *veratria* and *white-hellebore*. Colchicum is armed with a virulent alkaloid closely analogous to veratria, and eminently possesses, in common with the set that furnishes its fellow-members, a tendency to disturb the digestive machinery.

VI. The **EMETICS**.—Ipecacuan and squill become the chief figures of this group, not only by the distinctions of practice, but by essential quality; but the former, which is more frequently employed than any other vegetable emetic, differs from the latter, in acting gently, and without danger of poisonous irritation. *Tobacco* is so dangerous that it ought scarcely to be used, even for the limited purpose of inducing nausea. *Chamomile* and *horse-radish* have some claim to be mentioned here, since, in the form of weak and warm infusion, they may be given to promote the success of emetics. The merits of *mustard* are not forgotten.

VII. The **EXPECTORANTS**.—The greater part of the remedies which we must class under this name are of obscure and doubtful utility. That there are any bodies endowed with a specific tendency to purge the lungs, is a general point of scepticism in the profession.

All that can be granted to the expectorants is this, that they include the pectoral follicles and exhalants in a universal influence either tonic or antispasmodic. Thus, in the one case, they may brace them against a laxity causing superabundant excretion; and, in the other, relieve them of a constriction by which they are prevented from rendering accumulated sordes thin enough to be dislodged. But this alternative does not suffice to exhaust the diversities of those that are of vegetable origin. We can institute four very distinguishable orders.

1. The *Balsamic Expectorants* are benzoic acid, benzoin, Peru balsam, Tolu balsam, myrrh, and storax. Balsamic is an appellation chemically restricted to natural products prevailed with benzoic acid, as are all those included in this order but myrrh, which is placed along with them only on account of its therapeutic relationship. Neither does it seem very much estranged in physical character, if we inquire not too deeply into its constitution. For it displays a like fragrant odour and aromatic taste, indications of the same stimulant, warming, and diffusive energy; and it contains volatile oil and resin, elements also existing in the others, and contributing not a little to their effect, though much of it is due to the acid. This, indeed, being employed in a separate state, appears as an individual in the order. They excite the bronchial exhalants to an increased secretion of watery halitus, and by thus obviating viscosity in mucus or pus, facilitate expectoration. But they must be avoided when there are any symptoms or premonitions of inflammatory action. A right conception of their tendency may be gathered from their having acquired some reputation as tonics, not only against dyspepsia, but against the wider influence of ague.

2. An order of *Fætid Expectorants* may be made up of the borrowed names *garlic*, *assafætida*, *galbanum*, and *ammoniac*; for, indeed, most of the fætid bodies in the first order of the third class are administered in pectoral complaints, where they act much in the manner of the above group, though better fitted for those cases in which the exhalants are constricted.

3. The *Nauseant Expectorants* consist of Seneka snakeroot with *ipecacuan* and *squill*. That the relief they afford in constriction of the bronchial capillaries is intimately connected with their emetic power, has an evident confirmation in this, that, unless given to the extent of inducing a degree of nausea, they are seldom of any efficacy in the severer forms of asthma, and other kinds of respiratory derangement.

4. The *Narcotico-nauseant Expectorants* are, lobelia, thornapple, and *tobacco*, which, as they combine a nauseating and antispasmodic virtue, must be potent remedies in asthma and dyspnœa. To elicit their full powers it is necessary they should be exhibited till

nausea occurs ; but this must be very cautiously attempted, for they are dangerously energetic. They are all hypnotic and anodyne. Lobelia is imbued with a volatile acrid principle similar to nicotina, the element found in tobacco. A virulent alkaloid, partially volatile, and named daturia, passes for the active principle of thornapple.

VIII. The **DIURETICS** afforded by the vegetable kingdom may be distinguished into three orders.

1. The *Terebinthine Diuretics* are these eight, Canada balsam, copaiva, elemi, juniper tops, juniper berries, mastick, Chian turpentine, Venice turpentine, and *oil of turpentine*. For without impropriety, copaiva, elemi, juniper, mastick, and Chian turpentine, may be considered in one group with the truly terebinthine bodies. They resemble them much in physical properties ; and, from such as have been analysed, there are obtained volatile oils, similar to that yielded by the exudations of the pine trees. Those of copaiva and juniper agree with oil of turpentine, in being composed of $C^{10} H^8$. This oil is of itself applicable to most of the uses of the order, which are little important as mere diuretics. The chief purpose of their administration is the cure of mucous and purulent discharges from the urethra and bladder. Since they are absorbed into the system, they may operate by actual contact with the mucous tissues independently of the medium of the urine, for they have also been effectual in leucorrhœa and chronic catarrh.

2. The *Bitter Diuretics* are an order easily compiled by adding to broom-tops, *bucku*, *pareira*, *pyrola*, *squill*, *dandelion*, and *bearberry*, inasmuch as when debility of the system originates or accompanies dropsy, several bitter substances are profitably exhibited. Their agency may, in a great measure, be attributed to a general tonic alteration, by which the minute vessels, exhalants as well as absorbents, are brought into healthy exercise. But it is reasonable to believe that the most effectual at the same time stimulate the activity of the kidneys, for they promote diuresis even when dropsy does not exist. From such a view of squill, indeed, there is no dissent. Cullen judges broom-tops a powerful diuretic ; and in pareira, Sir Benjamin Brodie finds an effective determination to the urinary organs. This medicine, together with several others blending aroma or astringency with bitterness, and having resin as a part of their constitution, are frequently employed in urinary maladies, as we formerly took occasion to observe.

3. The order of *Narcotico-acrid Diuretics* has, for its main body, foxglove and bitter-sweet. The interference of narcotic power with more specific action, is in no remedy so remarkable as in foxglove. Whatever be the explanation of it course, it cer-

tainly tends to augment the urinary secretion, but its progress is overhung with a danger to the nervous and arterial systems, demanding our chief attention in its use. But this is not the only narcotico-acrid gifted with diuretic energy, and a depressive influence on the apparatus of the circulation. From among the antispasmodics, tobacco, monkshood, cevadilla, and the hellebores may be taken as examples. Colchicum, from the diaphoretics, is of a similar character, since it not only diminishes the fulness and frequency of the pulse, but, if conjoined with a cool regimen, tends, like most others of its own class, to call forth renal instead of cutaneous activity. As for bittersweet, little has been done to determine the relationship it bears to the rest.

IX. The REFRIGERANTS are, citric acid, lemons, limes, hips, and *tamarinds*. The name must not lead us to expect, in the bodies to which it is appropriated, an intrinsic power of counter-acting animal warmth. Only when given in draughts at a temperature beneath that of the frame, do they effect any perceptible change, so that the refreshment afforded in ardent fever and the phlegmasiæ, entirely arises from the physical operation of cold. Their alleviation of thirst is perhaps more independently procured; for something must be conceded to their acid constitution and taste.

X. The ANTHELMINTICS are to be considered in three different aspects.

1. The *Tonic Anthelmintics*.—As debility of the digestive organs promotes the generation of intestinal worms, tonics are very often required, particularly those of the bitter kind, which even appear to be poisonous to the creatures, and may therefore be used in the way of injection, when the rectum is infested with ascarides. We may therefore make up such an order as this by drawing upon the third division of class II.

2. The *Cathartic Anthelmintics*.—From the condition of the bowels, and the pertinacity of their occupants, nothing can be more obvious than the propriety of placing some of the more powerful vegetable cathartics as an order of this class.

3. The *Specific Anthelmintics* are male shield-fern, cowitch, and Carolina pink, with the four subsidiary names of *garlic*, *assa-fœtida*, *pomegranate-bark*, and *oil of turpentine*. By specific anthelmintics are meant those, of which the whole, or the main efficacy is directed to the worm itself. Cowitch, one in the former predicament, operates by irritative bristles. Garlic, assa-fœtida, male shield-fern, and pomegranate-bark, seem to be fatal to it through their acrid oil. But a dislodging, as well as a destructive power belongs to oil of turpentine, and Carolina pink.

XI. The EMMENAGOGUES.—If we consider how varied may be the circumstances connected with a delay, a retention, or a sup-

pression of the menstrual discharge, we cannot but be perplexed with many difficulties in defining the applications of Emmenagogues. It is a function so closely dependent on the condition of the digestive apparatus, and on the health of the system at large, as affected by other important organs, that the credit of promoting it is in most cases due to a series of general operations, not to any individual appliance.

1. The *Cathartic Emmenagogues*.—Some agents, when they enter into our plan for eliciting a flow of the menses, are given to the extent of purging. *Colocynth* and *black hellebore* are exhibited seldom, and with caution. *Aloes* is the safest and most popular.

2. The *Specific Emmenagogues* are ergot of rye and savin, *rue*, *myrrh*, *garlic*, and *assafœtida*. The term specific, it must be confessed, wears in medicine very nearly the complexion of the term chance in common speech; that is to say, it expresses little else than mystery. The *modus operandi* of myrrh will perhaps be easily explained, if we may regard it as a tonic. An inquiry into that of garlic and assafœtida, but still more of savin, rue, and ergot of rye, would need a lengthy disquisition, and only lead to conflicting opinions. Yet it is generally held that the three last have a powerful influence on the uterine system; in so much so, that their use must be conducted with great care.

XII.—The *SIALAGOGUES* are abundant, for to pellitory of Spain we may add *horse-radish*, *sweet flag*, *mexereon*, *tobacco*, and *ginger*.

XIII.—So are the *ERRHINES*, which also occur in the foregoing classes.

XIV.—The *DEMULCENTS*.—Under this name are comprehended a number of the vegetable bodies, that may be separated into those forming a part of human diet; those taken internally, but not as food; and those only outwardly applied.

1. The *Dietetic Demulcents* are, sweet almond, wheat-starch, oats, *tous-les-mois*, Iceland moss, flour, barley, arrow-root, sago, and tapioca. At the same time that these are useful for some minor therapeutic purposes, they are highly important in the dietetic department of practice, contain excellent principles of nutrition, and may be taken without any limit but satiety. The only one tainted with medicinal power is Iceland moss, which is rendered somewhat tonic by the possession of a bitter ingredient. But this bears a small proportion to the starch, its alimentary component—a proximate principle widely diffused through the vegetable world, and forming the foundation of each article in this order, but sweet almond.

2. The *Non-dietetic Demulcents* are, marsh-mallow leaves and root, liquorice root, gum-arabic, linseed, and tragacanth.

Though some of these, as linseed and gum-arabic, are capable of yielding nourishment, they are not employed otherwise than medicinally. They are all very insipid but liquorice root, which is sweet, and their operative principles are various, being gum, oil, mucilage, or saccharine matter.

8. The *Emollients*, or *External Demulcents*, are raw cotton, linseed meal, linseed oil, common mallow, and *olive oil*. Except raw cotton, which consists of simple fibre, they have oil or mucilage as active principles.

XV.—The *IRRITANTS*.—Every substance that is applied to the surface of the body, without intent of absorption, but with a view to contra-stimulus, or to other than narcotico-anodyne, tonic, astringent, and emollient ends, may be embraced in the designation irritants. The numerous vegetable members of this class are obviously separable into the rubefacient, the detergent, and the epispastic.

1. The *Rubefacient Irritants* are, concrete oil of nutmeg, oil of marjoram, Burgundy pitch, and oil of rosemary, with *ammoniac*, *assafetida*, *cajuput oil*, *capsicum*, *croton oil*, *galbanum*, *black pepper*, and *oil of turpentine*. They are placed or rubbed on the sound skin, in order to excite it short of vesication. Most of them, when long continued in either way, produce a pustular eruption. Croton oil is the most eminent for this.

2. The *Detergent Irritants* are, common carrot, pitch, tar, and resin, with *elemi*, *savin*, and *Venice turpentine*. The term detergent is to be applied to such an action on a part ulcerated or denuded of cuticle, as will cause a continued purulent discharge, that effects, by a succession of particles, the removal of old pus, and sloughed solids.

3. The *Epispastic Irritants*.—Bodies acrid enough to elicit an effusion of serum beneath the healthy cuticle, on which they are laid, must, in a manner eminently derivative or revulsive, diminish the inflammation and engorgement of neighbouring parts, and are therefore styled epispastic. *Επισπαστικά* attrahendi vim habentia, the definition of Celsus, is current and philosophical to this day. The names to be drawn into this order are all borrowed, and are, *garlic*, *horse-radish*, *mezereon*, *euphorbium*, and *mustard*. We may use the last as a rubefacient, without persisting in vesication. It is more speedy and transient in its action than cantharides. Therapeutic rapidity, and the possession of a highly volatile element, seem to be inseparable.

XVI.—The *COLOURS* and *TESTS*.—There still remain four interesting bodies that we could not place in any of the preceding classes. They are, litmus, red sandal-wood, corn-poppy, and saffron, which, if we add to them at second hand *violet* and *turmeric*, will make up a class of colouring and testing agents. Colour-

ing agents are employed to tinge compositions ; testing agents, to give witness to latent principles. Of the former use are saffron, corn-poppy, and red sandal-wood ; of the latter, litmus ; and of both, turmeric and violet. Saffron is of a bitter taste, and a heavy aromatic odour, depending upon an acrid volatile oil, to which it owes its now nearly discontinued esteem, as an antispasmodic and emmenagogue.

This system, which I have more fully treated elsewhere, is what seemed best fitted to show the vegetable resources of our lately revised Pharmacopœia. Though it contains few terms and titles but such as have been long known to the profession, the manner in which it was constructed was designed to infuse the freshness of advancing discovery. The names of the capital groups are no other than those which the fame of Gullen and Murray has made classic in pharmacology. But, in assigning to these groups their individual members, a strict regard has been paid to recent therapeutic and chemical progress ; and the weight of venerable authorities has not obviated the preponderance of what seemed justly due to modern activity of research. If, then, the classes are properly constituted, one who contemplates some of the more numerous, may be led to inquire whether any of their members serve a better end than to increase the labours of the teacher, to burthen the student's memory, and to encumber the medicinal store-room ; whether, in short, they are not, in every point of view, redundant, and stand on the pages of the Pharmacopœia rather as monuments of retired learning, than tools of active art. To me, however, it seems that the superfluities are but few, and that most of those that are obsolete in our daily prescriptions, it behoved the eminent framers of the Pharmacopœia to retain on the list, as ingredients in old, favourite, and useful compositions. Nothing was better fitted to open a door to this kind of criticism than such a scrutiny of the members of each therapeutic class, as would lead to the grouping together of those that are most analogous within it, or, in other words, to its subdivision into orders. For thus it could most readily be shown how many were similar, and what member had its purposes exactly served in another. The ground chosen for the foundation of these comparisons could not uniformly, throughout the system, be made the same. Sometimes it needed to be physical, sometimes chemical, and sometimes therapeutic ; and that each of these kinds of analogy has prevailed in turn, will be made obvious by a glance at the preceding pages. Such a system cannot claim to be logically perfect ; for this, indeed, there was no ambition. It was meant neither to unfold a theory, nor to establish a criticism. Its object was to ascertain the most authentic properties of individuals, to form groups upon practical analogies, and to display the rich and varied treasures of our vegetable *Materia Medica*.

ART. VIII.—*Extract from an unpublished work on the importation and propagation of Plague and other contagious diseases.*

By Dr FERGUSSON, Inspector-General of Army Hospitals.

Yellow Fever.

A body of European troops arrives in a West India colony, and soon after the yellow fever breaks out amongst them. The seasoned Creolized white inhabitants feel little or nothing of it, and the coloured classes without exception, the most numerous, by at least ten to one of the inhabitants, with whom all strangers are ever in necessary close communication, stand by absolutely untouched. How is this? Import small-pox or any truly contagious disease, and they will suffer far beyond the usual sufferings of Europeans. Take them to England, they will be as liable as ourselves to fall under the dominion of typhus fevers—to the Levant, under that of the plague; of psora and syphilis, and every other infection they will have their full shares. Yellow fever alone they cannot take; and how is this to be explained but upon the obvious fact of that disease being a seasoning fever of malignant type, peculiar in a great degree to newly arrived Europeans, the product of high temperature and unwholesome locality alone, which, when they come in the crowds of a military expedition, will devastate with all the fury of pestilence winged on the false terrors of contagion, to which the imitative tendencies and involuntary sympathies of our frames, have in every epidemic, when once begun, added tenfold force; but let us here examine somewhat more closely.

One would naturally suppose that, wherever a true infection existed, the hospital where all the sick are congregated would not be the place of safety, yet there, notwithstanding, is it most likely to be found. Apply this touchstone it will be seen that the medical officers never suffer more from the disease than their fair proportion, according to numbers; and the more immediate white attendants, orderlies and others, uniformly less, if the ventilation and discipline be good, than the soldiers in barracks who never go near the place; because, while so employed, they are saved from exposure to the sun's heat, to night guards and drunkenness. This I proved from incontestable hospital returns when I was last in the West Indies, as also, that the supposed contagion was never communicated to the surgical sick, the convalescent and others, although occupying the most contiguous beds in the same hospital.

Take another proof. A sugar ship loading at anchor, or a transport, will, as hundreds and thousands have done, lose part of her crew by yellow fever. At last she sails full of the *fomites*, or even of the persons of the diseased. Now here is the assumed

contagion fairly impounded without escape, and one would suppose the disease would then do its worst ; yet it does not. It uniformly stops—the sick recover every day the ship sails to the northward ; she cannot in a clear uninterrupted passage, carry the pestilence beyond the tropic, and unless her destination be Gibraltar, Cadiz, or some other port, already under the influence of the disease at the close of the advanced summer season, where the heat has long been equatorial and the atmosphere (a European one) in all probability stagnant, and as well adapted to reproduce it as any part of the West Indies, she will arrive as free from contagion as the first day she left the stocks. But this will not satisfy the quarantine master. He has been placed there to find contagion, and, as has happened more than once at Gibraltar, will be sorely puzzled to account for the aggravated remittent fevers approaching to, or altogether the yellow occurring before his eyes, when this fortunate chance from the West Indies will at once enable him to cry pestilence, excommunication, importation, fumigation,* and all the mummeries practised by that class of officials. Try again :

In the crowded transports at the beginning of last war, typhus fevers were frequent amongst newly embarked troops, and they of course, according to the doctrine of the day, carried the contagion to the West Indies, which afterwards became yellow fever under that exalted temperature. Here at last was importation proved, and *typhus flavus*, *typhus ictorodes*, or *icteroideus*, became the true orthodox creed. But alas for the faith : typhus fever will not stand carrying to warmer latitudes. If the ship be even ordinarily clean it will vanish long before you can have entered the tropics, and you may as well attempt to transplant a willow tree or a hazel into a West India colony, as a fever of that class. I do not utterly deny, although I never saw it, the possibility of landing typhus fever there from out of a foul crowded ship, but it will not stay ; it will disappear infallibly as soon as ventilation, even in the most ordinary degree, is restored. It is not to be denied that crowded convict and emigrant ships have carried typhus fever through the tropics to the Cape of Good Hope and Australia, but no importation, however foul, could establish it in these countries, or cause it to spread, nor is it, I believe, known in them even now. Seeing, then, that neither will our typhus admit of being carried to the West Indies, nor will their yellow demon be induced to visit our shores, that each will preserve its own locality and field of operation, we come again to the question what is it ? There is much in a name, and the French have defined it in one word, *la fièvre Européenne*. Well for us had

* On my last return from the West Indies, in the year 1817, I was subjected to personal fumigation on three successive days, at the quarantine station Isle of Wight, lest I should introduce the yellow fever into England.

we stuck to this true definition, for it would have saved an infinity of controversy, panic, and delusion. It is in a great degree peculiar to the western world, for we have no such bursts of yellow fever in the East, nor, I believe, on the shores of the Southern Pacific, as those which periodically sweep over our western colonies, but it is not unknown in the former, for one of its earliest designations was the *maladie de Siam*, although it never can be called the same destroying scourge that afflicts the western world.

It came from Boulam, say the contagionists, and is a pure contagion of negro intercourse, a concomitant of the old slave trade; but the black, as we have seen, never had, and cannot take the disease; and long, I believe, before our slave trade existed, or if it existed at all, must have been in embryo when Penn and Venables first subjugated Jamaica to the British crown, the invaders, (a most lawless bucanier force, by-the-by) were so handled by the tropical pestilence, that it was believed they had become the objects of Heaven's peculiar vengeance. Its unexpected bursts invading when there is nothing that we can discover in the seasons to account for such a visitation, are strange and mysterious, but not more so than amongst ourselves, when diseases, previously mild, suddenly change their character and assume the most malignant aspect. We may often witness even under our best temperatures, unexpected attacks of malignant erysipelas, puerperal fever, scarlatina, measles, &c.; while at other times, apparently of more unfavourable aspect, these probably cannot be called into existence at all, or if they do come, are unattended with any malignant character. These things are beyond our ken,—we can only see, and tremble, and wonder; but fever (idiopathic fever) is itself a mystery. Here at home, in the cold humid atmosphere of the British isles, man generates and exhales from his own body the poison of typhus fever, which may afterwards become an infection of accumulation capable of being spread to quarters far distant from the original source. Of this we have a proof in the fever brought home from Spain by our troops after the disastrous retreat to Corunna, and another not far off, in that of the French on their return from Moscow. In these our latitudes, "cold and fatigue, and sorrow, and hunger," under circumstances of accumulation, will generate it everywhere; but every region, every climate will exhibit its own form of fever. With us it is typhus; in the warmer countries of Europe, remittent; in the Upper Mediterranean, plague; in the Antilles and Western Africa, yellow fever; but to generalize and confound them together would be generalization run mad, for it would be difficult to conceive diseases belonging to the same family more directly opposed to each other in all their history and symptoms. Our little domestic plague has been well called nervous fever, for its leading characteristic

(when it has a characteristic) is that of subacute inflammation of the brain, that of the remittent, gastric, and cerebral, of the plague glandular and carbuncular; of the yellow fever, gastric most decidedly, for though it always begins with headach, often of the most violent kind, that symptom generally abates long before the termination of the disease, leaving the brain singularly free and disengaged. This work pretends to no merit beyond that of being sketchy. I shall not therefore attempt to dive deeply into the mysterious manifestations and phenomena of fever, but confine myself to those forms which have so often devastated our armies. Some writers have tried to establish the analogy between yellow fever and plague, but who ever heard of plague being located within the tropic where yellow fever alone prevails, or who ever saw amongst the symptoms of this last, gangrene of the skin, with carbuncular and glandular swellings?

If ever there was a disease which the humoral pathologist might claim for his own, it is yellow fever. The crisis of the blood is as much broken down before death and its vitality destroyed, as it could be by introduction of the poison of the serpent's tooth; we may truly say it is killed by the poison, and in the language of John Hunter, that "fatal yellow fever is the death of the blood;" it wells up in floods from the mucous surface of the stomach in the form of black vomit; it escapes from the guma, the nostrils, the eyes, the ears, even the skin itself, in any or every part, and after death it will be seen to have lost all the character and composition of blood, being found in its vessels like the lees of port wine, or the grounds of coffee. But as I know well from dire experience, the affection from the first must be essentially gastric. The vomitings at the beginning are always in themselves clear and clean, presently they become somewhat ropy, then brown, dark, and darker till at last the attenuated blood, escaping from its vessels and mixing with the gastric fluids, comes up under the form of black vomit. Meanwhile the functions of the brain will be restored and retained. Self-possession and courage ordinarily characterize the disease. I have seldom known any who could not give clear directions in regard to the disposal of their affairs, or fail to conduct themselves with the firmest resignation. It is not always, nor often, a painful disease in its termination, and the vomitings are never I may say attended with pain. A gallant officer said to me, "You see I am posting fast to the other world, and you cannot prevent it, but I am as easy as if I was in a post-chaise." Sir James Leith, who died Governor-General of the Windward and Leeward Colonies, whose chivalrous, heroic character, graced and adorned the military profession, when he contemplated that harbinger of death, the black vomit, pouring from his stomach, on the evening preceding to his death, rose from his couch in full posses-

sion of all his acumen, to execute some legal deeds of importance, declaring at the same time, in reply to my dissuasions, he could with equal facility have drawn out a plan for military operation. This *sang froid* so characteristic of the disease has often excited wonder. Lieutenant Wright, one of my earliest patients at Port au Prince, St Domingo, on the fourth day of the fever, rose from his bed in perfect possession of his senses, dressed himself correctly, and went into the market-place accompanied by myself, where he spent some time purchasing fruits and other things, returned to his barrack-room, where he shortly expired in a torrent of black-vomit. Lieutenant Mackay of the quarter-master general's department, Cape St Nicholas Mole, on the day of his death, was up and dressed on the sofa, with books and papers before him at ten in the morning, passing jokes of comparison between his own dingy complexion, made so by the disease, and that of his *malatto* nurse; at two he expired in the same way as Lieutenant Wright. One case more I will quote, for its exceeding singularity, even above those I have just given. A sailor on board the flag-ship Admiral Harvey, with whom I was taking a cruize for my health in the year 1816, was attacked with yellow fever, but he would not acknowledge he was ill. He was all the time up and dressed one of the earliest in the morning, saying that there was nothing the matter with him, and that he would go back to his duty next day. He owned he was sick at stomach, and that the vomitings were dark-coloured, but that was from the red-wine negus they had given him to drink, or the coffee which the cook had spoiled, and therefore made him sick, and in this persuasion, instead of going to his duty, he died on the following day.* These appearances were not uniform, and many died under very different circumstances, but where they existed at all, or can exist, will any one pretend to say that they can belong to such a disease as typhus fever; that self-possession, high courage, and energy of intellect can assimilate with utter prostration of mind and body, with fatuity and helplessness the most deplorable, and where at the best, so deeply is the brain and nervous system involved, that it uniformly tends to death by coma; or with the plague, evidently a disease of the absorbent system, rather than the blood?

The question of its identity with remittent fever in its higher grades is more difficult, and requires the closest examination. The presumed difference is the stronghold of the contagionist, and were we to admit, which I do not, that malaria and marsh miasmata were the same element, it would be difficult to beat him out of it. Most certainly, yellow fever has often prevailed on the finest soils, and in situations where the agency of marshes could not possibly exist. It will be more likely to extend its ravages where it has

* Similar cases are given by Dr Rush in his *Inquiries into the Yellow Fever of Philadelphia*.

their co-operation, but it assuredly can exist without it. The singularity is, that, with or without this agency, the course and the event will be precisely the same in all severe cases as if it had been the sole agent. The marsh is doubtless the most common field of operation, but it is not the only one, and we must own that there may be other terrestrial emanations of deadly character besides those of the swamp. This is very perplexing, for remittent fever is a regular disease of season in all hot countries. It seldom displays the fury of an epidemic, and its invasions, progress, and departure, can be calculated upon with something like certainty. The yellow fever attacks in furious currents, often quite unexpectedly, and rarely, even in the West Indies, invades in successive years. Remittent fever is an annual of the eastern tropic, the same as the west. Yellow fever, though not unknown there, is never, I believe, epidemic. Remittent fever often runs the patient into the grave, but seldom with black vomit; the true yellow fever always. In the first an emetic, although it may not be a recommendable prescription, may be administered at almost any period of the disease with safety; in the second it is ever fatal and deadly.

Were the last no more than a disease of bodily condition in the unseasoned European, why is it so often away, as it frequently is for years, when the worst remittent fevers prevail, or if an affair of seasoning alone, why should it attack a seasoned garrison, say of Gibraltar—in one year out of eight or ten, and eschew the visitation in all the others of equal, or, it may be, of higher temperature? These are puzzling considerations, quite enough to make any candid man pause before he permits himself to pronounce upon the identity of two diseases so apparently different in their manifestations, progress, and history. They will often appear together, and run side by side, causing much confusion to the inquirer, but are they the same? Whether they be or not, one point has been clearly ascertained, that there is no contagion whatever appertaining either to the one or the other. Even the matter of black vomit itself cannot be made to serve the purpose of an inoculator. It has been received hundreds of times upon the hands, the clothes, and persons of the attendants, with impunity. The dissector has often subjected it to chemical examination, and others have sought a more intimate acquaintance with the same results.* And after all the foregoing is this more unaccountable than what

* To show how the American faculty appreciated this vaunted contagion of black vomit, I will here relate an incident I recollect reading in a periodical of the time. A party of them had procured a chamber-vessel full of the liquid from a dying patient; this they tasted, smelled to, stuffed up their nostrils, into their ears, and inoculated themselves in every variety of way, until one of them; but here I must call the aid of another language; *oculis, in syringem quæ forte ibi jaceret, coniectis; instrumento hoc in manus sumpto, et nigro liquore impleto, enema copiosum in corpus suum injectit.*

every experienced man has witnessed here at home in our own scarlatina, where, in one of its epidemic visitations, the patient will suffer no inconvenience but from the *nimia diligentia medicorum*, and in another be struck with death as hopelessly and irremediably as if he had been bitten by the rattlesnake.

There are pure soils in the West India, as pure as any on the earth's surface, but I will venture to say, send a European army to the best of these, and if it be near the level of the sea, they will be extirpated just as surely as if they had been located in Demerara, or any of the deepest swamps in the world. This is a sad exposure, but turn to our annals, it will there be seen that every expedition sent from any part of Europe, (even including French and Spanish,) to the Havannah, Carthagena, St Domingo, or the windward Antilles, had but one termination, and that, too, for the most part within the year—the burial of the troops from yellow fever. Of this I shall here offer some illustrations. The grand armament from Cork reached St Domingo early in the year 1796. The intention being to conquer and retain the country, it comprehended a noble host of many thousand men, including light cavalry and every other arm of war. The regiments on landing were in general healthy, at least the 67th regiment, of which I was surgeon, was in perfect health. Soon after disembarking, yellow fever broke out amongst the troops, at every station and in every place. The mortality was about the same everywhere, or, if possible, it was worse at Cape St Nicholas Mole than at any of the other stations. This was strange, for if ever there existed a dry rocky, but jungly district in the world, it was there. Having in the after part of our service in St Domingo, been stationed there for twenty months continuously, and made it my daily practice to traverse every part of the locality, I can speak to that point without hesitation, the only difference being that, as soon as the seasoning fever had passed away, the district became healthy, and continued so, while in all the declared malarious quarters there was no cessation of the sickness. I speak here of the officers in every rank. These at first had suffered even in greater proportion than the men, but afterwards they became as healthy a community as ever I lived amongst in any part of the world. It was different with the common soldiers, whose drunkenness in those days was unrestrained and terrible, and in that climate they suffered the usual consequences. On inquiring amongst the French faculty and the old inhabitants of the place, we learned that during the American war, when a large body of French troops had arrived there from Europe to aid in the invasion of Jamaica, they had been destroyed by the same fever as fast or faster than ourselves; and to show how fast that had been in our case, I shall here give a melancholy proof. During the earlier part of our residence,

while all were deeply interested to stop the mortality, a census was taken of the inhabitants of the town, (exclusive of the negro slaves,) and the white soldiers, when they were found to be as nearly as possible of equal numbers, but by the time we had buried the original complement of 1500 men, they, the inhabitants, had not lost more than one in thirty of all ages.

The island of Barbadoes affords another instance. It is impossible to imagine a country of purer soil, and better ventilation. It has long been thoroughly cleared, and there being no mountain ridges of sufficient elevation to obstruct the breeze, and create a night-land wind, that from the sea blows night and day, making a fair breach over the land; but as it is the ordinary landing place of fresh troops from Europe, there was no place during the war where there existed greater mortality and suffering from yellow fever. In fact, *la fievre Europeenne* prevailed there, and will prevail in every part of the West Indies for as long as its population is furnished from the colder regions of Europe. Still, however, does it proceed from a terrestrial poison? The sea exhibits none of it. While we were thus perishing of yellow fever at Cape Nicholas Mole, the cruising squadron, comprehending eight sail of the line, with many smaller ships, was healthy, none suffered yellow fever but those that were obliged to lie as guard ships at the unwholesome anchorages of Port au Prince, or Port Royal, Jamaica, and such like; and when in the great naval campaign between Rodney and De Grasse at the close of the American war, the decisive action of the 12th of April took place, the contending fleets were healthy, and yellow fever did not exist amongst them. Fleets have often remained healthy for years (at least free from yellow fever, unless when they got it at the unwholesome anchorages of Port Royal, Jamaica, English harbour, Antigua, or Port of Spain, Trinidad,) in the West Indies,—armies never.

No experienced men unblinded by the prejudices of the schools and authorities, or biassed by the expectation of quarantine office, can seriously believe it to be a contagion. It is a terrestrial poison which high atmospheric heat generates amongst the newly arrived, and without that heat it cannot exist; but it effects no one from proximity to the diseased, and cannot be conveyed to any low temperature. This was finely exemplified at Port au Prince, St Domingo, where I spent the earlier months of the year 1796. Our headquarters were the town and its adjunct, Brizzoton, as pestiferous as any in the world, and there we had constant yellow fever in all its fury. At the distance of a mile or two, on the ascent up the country, stood our first post of Torjean, where the yellow fever appeared to break off into a milder type of remittent. Higher up was the post of Grenier, where concentrated remittent was rare, and milder intermittent with dysentery, the prevalent form of dis-

case, and higher still was Fourmieri, where remittent was unknown, intermittent uncommon, but phagedenic ulcers so frequent as to constitute a most formidable type of disease; and higher still were the mountains above L'Arkahaye, of greater elevation than any of them, far off, but within sight, low down in what was called the bight of Leogane, where a British detachment had always enjoyed absolute European health, only it might be called better, because the climate was more equable than in the higher latitudes. Here were the separate regions or zones of intertropical health mapped out to our view as distinctly as if it had been done by the draughtsman. Taking Port au Prince for the point of departure, the three first could be traversed in the course of a morning's ride. We could pass from the one to the other, and with a thermometer, might have accurately noted the locale of disease, according to the descending scale, without asking a question amongst the troops who held the posts; and what kind of contagion must that be, which, amongst men in necessary intercommunication, cannot be conveyed from the one to the other, which refuses to mingle with another of lower temperature, although within sight, and so near, topographically speaking, as almost to touch. The men could, and did constantly exchange duties but not diseases; and it was just as impossible, and more so, to carry a yellow fever up the hill to the post in sight, as it would have been to escape, had they been brought down and located amidst the swamps of Port au Prince. These things were known to every person in the army, whether medical, civilian, or military, and amongst them all there was not to be found a single person who had the smallest belief in contagion, provided always he had been a year in the country, and possessed opportunity of seeing with his own eyes,—all I may say came out contagionists, * myself amongst the number, none remained so. It was impossible that we could, in face of the every day experience of our lives, and if we had, the very women and drummers of the army would have laughed us to scorn, because they had long discovered there was not the smallest danger to be apprehended from the closest proximity of the sick. The woman knew that when she slept with and attended her dying husband, she had not been infected, and all were sensible that no safer duty could be imposed than that of attending the sick bed.

* The vagaries of these strangers were at times very amusing. A newly arrived contagionist physician, struck with the great mortality on his sick list, despite of his very best prescriptions, was fortunate enough at once to hit upon the true reason; they had all been feeding—chewing the cud as it were, on their own poison. According to the common custom of hospitals the sick lay with their heads to the wall, and the matter of contagion which they threw out at every expiration, rebounding from its hard surface, was again drawn in with their breath, so that it was impossible they could recover. The word was forthwith given, feet to the wall, heads to the centre, (the middle of the room) and in this extraordinary position they were found on the following morning when the officer of the day, and the inspector made their daily visit.

I shall here pass over, as unfitted to a periodical publication, on account of their length and minuteness, various cases of unquestioned importation of yellow fever, where the sick were received into our hospitals literally with open arms, without ever communicating infection in any way ; and proceed to take up the question on stronger grounds, which, I believe, cannot be impugned.

Contagious fever, with the exception of the exanthemata, cannot exist in the torrid zone nor any where else in a temperature amounting to 80° Fahrenheit long continued.

It is infallibly dissipated by it. The infection of the plague itself has been proved to cease in the Levant on the advent of the midsummer heats, and to proclaim that the yellow fever is a contagious disease, while it is the product of the disinfecting principle itself, of that degree of atmospheric heat with which infection is incompatible, and the contagion of fever cannot exist, is as unphilosophic an assumption as ever was imposed upon the fears and credulity of the people. The most crowded slave ship that ever sailed from the land of rapine and crime, has never yet succeeded in generating infectious fever amongst the suffocating human cargo ; and the special law of retribution, through which, if such a disease could arise amidst the naked victims, their white oppressors certainly would be destroyed by its contagion, is here suspended by a mightier general law of divine wisdom which, by ever furnishing the disinfecting agent, has affixed its veto to the extension of contagious fever in the regions of the torrid zone. The schools will of course cry out against this invasion of an heirloom so cherished as contagion. They have long enrolled yellow fever in its lists, and to secure it a place, have dubbed it *typhus Africanus*, being the very disease Africans never had and cannot take ; but typhus is the watch-word of fear, and therefore far too valuable to the contagionist to be thrown away even in a tropical climate. It may be vain to tell him that the burning clime of Africa utterly repudiates the typhoid principle, and that if forced into it through the grossest mismanagement of sailing vessels, it will be dissipated as soon as the decks are purified ; the true contagionist ever holds to the faith and rejects the heresy.

Is this denied, look to the Eastern world, where throughout the whole extent of our empire such a phenomenon as a contagious fever has never yet been dreamed of. The tropical heat is most prolific of fevers, but never of contagious ones. For these, you must go to seek in the records of the quarantine office, and the superannuated prejudices of the medical schools of Europe. These authorities, however, are not easily beaten down. They are bolstered up by all the strength of the home faculty, who never have seen a tropical fever, and upheld by the power of government, whose patronage would be diminished were the state engine of

quarantine, so often used for political purposes, to be abolished. Besides, in these matters, the non-professional mind is little qualified to judge. It has ever been in the keeping of the home faculty, and almost any impostures, as may be seen from the patronage bestowed upon quacks, may be imposed upon it. Contagion has long been the creed of an age, it is to be hoped soon to pass away; and fashions in physic, more especially when upheld by power, are not to be opposed with impunity.

This has been a long disquisition for the *Edinburgh Medical and Surgical Journal*, and it must be full time to sum up if we can, and bring it to a close.

The yellow fever cannot be contagious, because the coloured races, whatever may be their exposure to the supposed infection, never take it; nor does approximation and communication with the sick, cause Europeans to be in the smallest degree more liable to fall into the disease than if they had never approached the sick bed.

It cannot be a contagion because it is restricted to particular localities, temperatures, and elevations. "Places, not persons," constitute the rule of its existence. It rarely admits of being carried in the persons of the most highly diseased to other localities, even of the same temperature, if better ventilated; and the villages in the neighbourhood of towns where it has been raging, and to which the infected have fled for refuge, have seldom or never become subject to the disease from admission of the strangers. This has been exemplified times out of number, at New Orleans, Vera Cruz, Gibraltar, and Cadiz. Places, not persons, comprehend the whole history—the etiology of the disease. The persons of the sick are always safe to approach—their habitations never. Change the last, the disease is certainly left behind; remove the first, and you at once annihilate the power of infecting others at the changed residence.

It cannot be a contagion, because the degree of heat that is found to dissipate the best marked contagious fevers, is the life blood of this. It cannot exist, but at the disinfecting point, and when the plague is dissipated by the heat, and rarity of the atmosphere, this begins. So it is with typhus fever. This last goes out when you enter the tropic, the yellow fever commences. The first mentioned is a communicable infection in the colder latitudes; the latter, the pure endemic of a hot climate that cannot be transported or communicated upon any other ground.

Again, places not persons. Let the emphatic words be dinned into the ears of the Lords of the Treasury of Trade and Plantations, until they acquire the force of a creed which will save them hereafter from the absurdity of enforcing a quarantine in England against an amount of solar heat of which its climate is insuscepti-

ble. Let them farther be repeated in the schools of medicine until their professors become ashamed of imbuig the minds of the young with prejudice and false belief, which, should they ever visit warmer climates, may cause them to be eminently mischievous in vexing the commerce, and deeply and injuriously agitating the public mind of whatever community may have received them. Once more, for the last time, places not persons.

Turn to the celebrated work of Sir William Pym on the *Bou-lam Fever* at Gibraltar in 1815, which has ever since it was published, so fatally influenced all the health authorities of the country, and at page 51 will be found an illustration so clear and conclusive, of the effects of change, even to the shortest distance, whenever yellow fever prevails, that it well deserves being recorded again for the guidance of all who may hereafter be called upon to act under similar circumstances. He tells us that, when yellow fever appeared in the town of Gibraltar he, armed with military authority, removed all the inhabitants of the infected locality, sick and well, with their baggage to the neutral ground outside the walls, and that the epidemic forthwith ceased. He ascribes the deliverance to purification of the houses and so forth; the philosopher would ascribe it to removal from malarious site. The conception was erroneous, to say the least of it, the execution so salutary that it ought to be held up for imitation in all times to come.*

Yet allowing all the foregoing to be incontrovertible, which it certainly is, still is there much of the unfathomable in regard to yellow fever—its occult sources—its appalling outbreaks, often without preliminary warning,—the absence of gradation in the types of fever previous to the grand explosion—its being restricted to the European races, and being confined almost entirely to the Western world, mark it as a disease equally strange and terrible. The idle stories of its being imported are negatived at once by the impossibility of conveying it, as we have just seen, even in the persons of the sick to the shortest distances—from the inside town of Gibraltar to the walls outside. Wherever it ap-

* His words are, "I directed a sufficient number of tents to be pitched outside the gates of the garrison, on the neutral ground, with a proportion of bedding, &c. and in the middle of the night, without any previous information being communicated to the inhabitants, a strong guard, with a sufficient number of carts, proceeded to the infected district, and conveyed the different individuals of the infected families, sick and well, with their baggage, to the encampment, which was established as a lazaret and kept in quarantine. I placed the sick in separate tents and appointed persons to attend them who had had the disease at a former period. A cordon of troops was established round the infected part of the south district, which was kept in quarantine for fourteen days; proper persons were also appointed to superintend the purification of the houses, furniture, &c., and to report the slightest appearance of disease among any of the inhabitants, who were also paraded and inspected daily by one of the hospital staff.

pears it is generated by the sun's heat from the soil of the place, and it cannot be sent or carried to another, for every spot must have its own, or none. Stagnation of atmosphere accounts for much in regard to it, but not for all; vegetable putrefaction for little or none; nor does malaria for the whole, unless it be some occult malaria of the Atlantic shores; for prolific as the eastern tropic may be, and certainly is, of malaria in all its forms, it rarely produces the epidemic characterized by the leading symptom of black vomit. *Pestis occidentalis* would be a good designation were it not for the superstitious alarm conveyed in the first word; and *fièvre Européenne* is far better. Establish this, and the question would be solved in as far as the West Indies are concerned. Gibraltar and Cadiz and the towns of North America are not so easily disposed of; but tell the importers that while true contagion, such as that of plague and typhus fever is never introduced into any of them—at least has not been for more than 150 years,—yellow fever appears periodically, and that, instead of looking for the coming of the pestilence from beyond the Atlantic, they should turn their attention to the sun that beams above them, to the ground on which they stand, and the qualities of the soil under their feet.

It is there the poison lurks and has ever lurked. Fly from it certainly, and enjoin all who have the means to fly the place. To pen up the inhabitants upon the infected ground is to aggravate the disease a thousand fold, and is in fact as cruel and absurd as it would be to barricade the doors against the escape of the inmates of a house that had taken fire, on the insane pretence that they would otherwise spread the conflagration. The quarantine authorities will no doubt interpose to save the world from the dire contagion, but let them be referred to the annual epidemic at New Orleans for information how often the yellow fever has been conveyed from thence to the upper settlements on the same river, to which the fugitives, sick and well, uniformly fly for refuge, or even to the steamers that carried them; how often at Vera Cruz it has been carried out of the town even to the first stage on the road into the interior; or how often in Spain it has ever been transported, except to another station under the same circumstances, of heat and drought and defective perfilation, therefore falling, if not having already fallen, into the same predicament from the same causes. Let them enquire whether seclusion and shutting up has ever saved the terror-struck. In the army of St Domingo it was notorious that they were ever the first to be taken ill and the surest to die; and during the yellow fever epidemic of 1816 at Barbadoes I have recorded remarkable instances of the same both from my own observation and that of others. In short, whenever the endemic agency could not be avoided, the best place of safety was

often to be found in the sick apartment, for there quietude reigned, and fatigue, exposure, and intemperance were most likely to be avoided.

One of the most scientific and enlightened physicians of his time, the late Sir Gilbert Blane, was nevertheless so staunch a contagionist, that, after admitting that yellow fever seldom appeared but in seaport towns, without spreading to inland habitations and the rural population, he does not stop to inquire how this could possibly have happened, had it been, like scarlatina and small-pox, a true contagion, but describes his opponents in the question as being filled with the blind and paradoxical rage of controversy, founded on prejudices and preconceived opinions, and having minds imbued with the dogmas of non-contagion. He surely ought to have seen that all their prejudices and preconceived opinions must originally have been on the other side, (at least mine were;) for the medical schools of Europe had never taught any doctrines but those of undoubted contagion, and the conviction of non-contagion must therefore have been an emancipation from, and victory over the inherent prejudices of education. The dogmas, too, that so indelibly imbued their minds, could only have been impressed there from seeing with their own eyes in hundreds and thousands of instances, that it was impossible to communicate the disease by personal contact. He assuredly was right in repudiating the folly of attributing the invasion of yellow fever, in such towns as Gibraltar and Cadiz, to the agency of marsh miasmata. I believe that none such can ever be said to abound; or I may almost say even to exist in either the one or the other; but their dense and growing population rearing obstruction to the breeze at every increase of buildings, besides accumulating every moral and physical nuisance, might well qualify them to become the subject of whatever endemic or atmospheric pestilences the season might bring. A contagious atmosphere might then easily be generated from condensed accumulation; but the persons of the sick would cease to be contagious as soon as they were removed into purer air.

Drought under an equatorial temperature, and in the favouring localities, would seem to be the *sine qua non* of the appearance of yellow fever in Europe. In the terrible epidemic of Cadiz, in the year 1800, no rain had fallen there for seventy days, (vide Annual Register,) and vegetable putrefaction had become just as impossible as the putrefaction of an Egyptian mummy, or the dried stock-fish of Holland. When the same drought pervaded Gibraltar and Barcelona, there needed not the arrival of smugglers to bring the pestilence, and the officious energy of the quarantine staff, when, by excommunication, fumigation, and such like, they affected to stay what the general laws of climate and season were in opera-

tion to accomplish, might be likened to that of the fly upon the wheel. For so long as the climate remained the same, they could not touch or turn the disease, and when its heat was diminished by the change of season, they could neither expedite or retard its departure. The becalmed bases of hills have ever been the favoured site of yellow fever, and, as at Gibraltar, that of Ascension Hill has repeatedly felt its scourges since the time of its famed importation there by the Bann frigate from Sierra Leone; and should that settlement ever grow into a crowded town, we may fairly conclude that its visitations there will be far more frequent than they have ever been at Gibraltar or Cadiz. Even here at home, in certain peculiar seasons of heat and drought, yellow fever may not have been entirely unknown. The year 1807 was one of these, when two soldiers of a militia regiment in the garrison of Sheerness, in Kent, died of a fever under my own inspection, whose cases might have passed muster for the endemic of St Domingo. Our climate luckily did not admit of its spread, for an opportune thunderstorm, with its accompanying deluge, and great reduction of temperature, washed out the beginning fever, and nipped the epidemic in its bud.*

Ships have often arrived in the ports and localities where the yellow fever was endemic with that disease on board, but, unless they came at the season of its epidemic spread, their advent would be as harmless as that of the healthful breeze of the sea. It never yet was imported as an infection anywhere, and while the disease continues as it is, never will be in this world. If it was not there before they came, they could not bring it, and if it was, the imputation would be a needless work of supererogation, as needless as that described in the homely saying of carrying coals to Newcastle. I am not here dealing in vague assertion, for I have given proof of the foregoing, in my reports of the Regalia transport from the coast of Africa, and of the Childers sloop of war from the Spanish-main, (vide Reports A. M. B. offices, and 8th Vol. Medico-

* Whenever in this volume I make use of the words contagion and infection—contagious and infectious, I offer them as altogether synonymous terms. I do not pretend to say that the signification of the Latin verbs *contingo* and *inficio* is in all respects the same, but so much confusion has resulted from the different meanings insisted upon for each, that I think it far better thus to resolve them all into one. In one of those terrible bursts of yellow fever at Gibraltar, about the beginning of the present century, the governor directed the medical staff to be assembled for the purpose of resolving on the best means of staying the pestilence. Having waited several days for the report he became impatient, and was informed that, as soon as the conclave had met, they fell into hot dispute as to whether the disease was contagious or infectious, and the point was not then decided. I think the conference ended in a resolution to fire and keep firing all the guns of the fortress for a whole day, which was accordingly done to the great astonishment of the adjacent countries and seas. The above is taken from an excellent, but, I fear, unpublished report of Colonel Wright of the ordnance department, who was then at Gibraltar. It may be proper, moreover, to add, that whenever the terms pestilence and pestilential occur they are not to be taken as implying contagion unless it be so stated.



D^r. Jackson's Case

Fig 1.

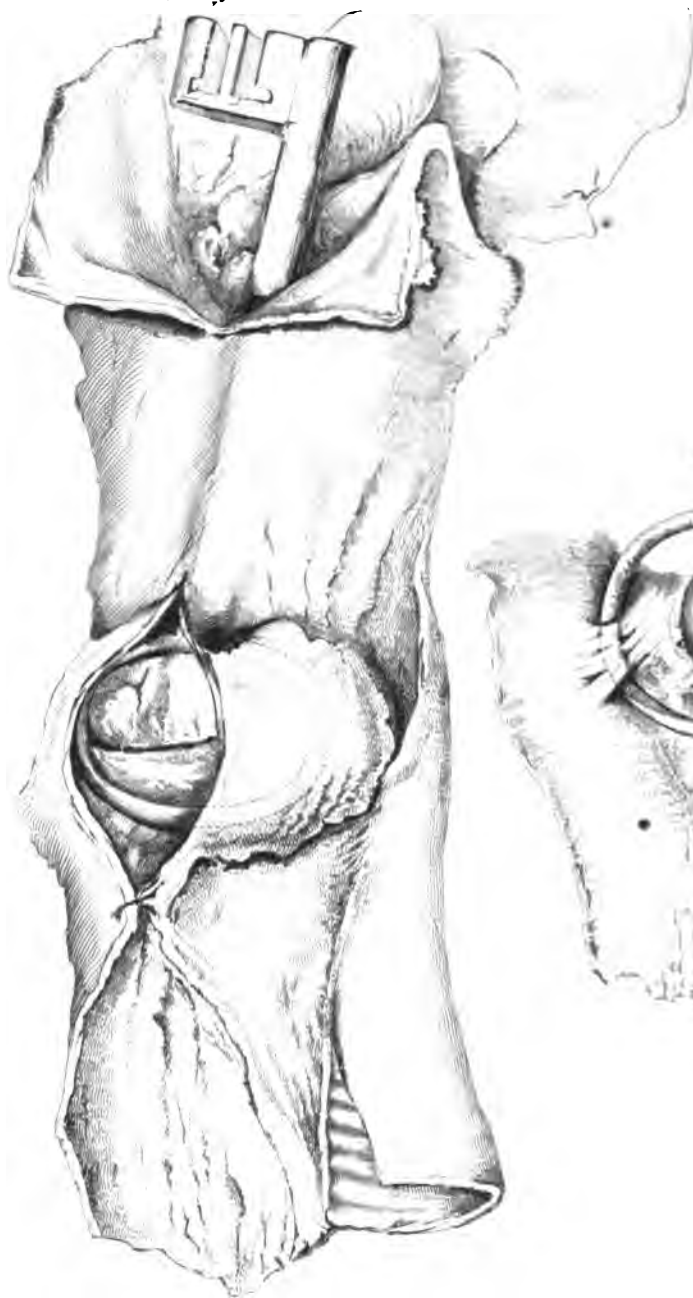


Fig. 2.



Chirurgical Transactions.) In both these ships the disease was certainly generated from the condition of their holds, because, as soon as they were cleaned and purified, the fever ceased. Before that was done, whatever stranger slept in either of them for a single night, was assuredly taken ill; whoever was brought sick ashore into the fully occupied wards of our general hospital, and received with open arms, brought with him as little infection as the new-born babe. Thus has it ever been and could not be otherwise, but the belief in contagion was dear to the panic stricken, the prejudiced, the designing, and the inexperienced, and they have ever sought to impress that belief on the world.*

ART. IX.—Account of a remarkable Case of Suicide from the presence of a large iron key in the Oesophagus, with Remarks. By ROBERT JACKSON, M. D., Resident Surgeon to the Leith Royal Public Dispensary, Humane Society, and Casualty Hospital, &c. (Read before the Medico-Chirurgical Society.)

ON the 4th February 1843, a message was left from Mrs M—— A——, residing in Laurie's Close, Leith. The patient was a widow, and had been so for several years. She was 42 years of age, and had once been in a respectable station of life, but for some years past had not been in good circumstances. She lived alone, and was accounted by her neighbours an active and intelligent woman, and had the character of managing some little property she had with ability enough. Latterly, however, she had been somewhat irregular, and often became much excited in consequence.

It appeared that my attendance had not been so much required from her own wish, as from that of a neighbour, who told me at the time some confused story about her having the day previous attempted to hang herself, but not succeeding in that, had swallowed some foreign body with the intention of committing suicide. The woman who gave this account was much inebriated, and Mrs A—— herself being calm and collected at the time, and positively denying such a charge, while the thing itself seemed so unlikely from her appearance and sufferings, I paid little attention to the report.

Mrs A—— complained of a slight sore throat, was a little hoarse, and had some pain in swallowing, but her breathing was natural; the fauces were slightly inflamed, which at the time apparently accounted for the symptoms she complained of. Nothing unusual could be seen in viewing the throat, and no body was felt by manipula-

* The first of these ships, in addition to a full cargo of liberated Africans, had, at the very time of sailing, laid in for fuel, a large quantity of green wood so hurriedly, that when I examined it, even the leaves had not all been stripped off; and the hold of the other was in a state of foulness and fermentation absolutely incredible.

tion externally. In consequence, however, of the neighbour's statement, Mrs A—— was desired to call at the Dispensary in the afternoon, when it was my intention to examine her throat with the forceps or probang. She did not however come, and I heard nothing of her till the 18th March, a period of forty-two days, when I was again requested to visit her.

Mrs A—— now informed me, she had never been well since I had seen her, suffering at times a good deal from difficulty in breathing, cough with expectoration, and some pain in swallowing, and she thought she was getting worse. I questioned her most seriously concerning her attempt at suicide ; she did not deny the attempt to hang herself, but reiterated again and again she never had swallowed any substance with that intent, and seemed displeased at my inquiries. The same neighbour, who was now acting as her servant, had withdrawn her belief of such a thing, and, as I could see nothing from the most searching examination, I concluded it had been the idea of a heated imagination.

She appeared at this time emaciated, pale, with an anxious expression of countenance, considerable dyspnoea, taking long inspirations, which were accompanied with a loud croupy noise ; her voice was hoarse, and she spoke in a loud whisper ; she had considerable cough, and copious expectoration of mucus of whitish-yellow appearance, but not more in quantity than is often seen in chronic bronchitis. There was considerable dysphagia, but not much pain, except at one small spot, just behind the thyroid cartilage ; she contrived, however, to take her tea as usual, and could swallow hard biscuit, for which she had a partiality. I have frequently seen a half-eaten biscuit of this kind lying on her table. She often also took beef-tea, wine, and could swallow pills. From these symptoms it appeared the patient was labouring under some affection of the larynx or trachea, and under this impression she was treated, being bled locally, and having had blisters applied to the part. She, apparently, cheerfully submitted to this treatment, and took the medicines which were ordered her from time to time readily enough. She remained much in the state described, till the day of her death, on which morning she took her breakfast, consisting of tea, an egg, and some hard biscuit. During the day she became weaker than usual, and was disposed to sleep ; by degrees her breathing became more and more laborious. Coma gradually appeared, and she at length sunk in the afternoon, dying without a struggle. Her death took place on Sunday the 2d April, exactly fifty-eight days from the time I had been acquainted with the case.

Post-mortem Examination.—The following Tuesday afternoon, assisted by Dr Robertson, I proceeded to examine the body. The seat of complaint was first inspected. For that purpose the trachea was exposed, and a transverse incision made above the epiglottis down to the spine. As soon as this was done, I observed the block of a key in the œsophagus, resting on the anterior wall of that tube,

close upon the epiglottis, but a little beneath it. The parts were removed for further examination.

It was now made evident that an iron key of a large size had been by some means introduced into the gullet of the unfortunate woman, and pushed so far down, or rather, into such a position, as to be beyond the reach of vision, when the throat was looked into.

The extremity of the block of the key rested immediately below the hyoid bone on the left side, causing a small patch of ulceration on the mucous membrane of the œsophagus, where it was in contact with it. The pipe or tube of the key lay on the anterior wall of the œsophagus, forming for itself a sort of groove or furrow, which exactly fitted it. About two inches down, was a small deep spot of ulceration, which extended through all the coats of the œsophagus, and went as far as the mucous membrane of the trachea, exposing and laying bare part of the thyroid cartilage. The ring or handle of the key in its descent had caught hold of a fold of the lining membrane of the gullet, and, by pushing this a little way before it had formed a pouch or sac, which had stopped its further progress. This fold of membrane, which extended right across the tube anteriorly, is well shown in the accompanying drawing, which is a most accurate representation of the parts taken *in situ*. The canal of the œsophagus was continuous posterior to this fold. From the irritation produced by this part of the key, inflammation had been set up, (which accounts for the particular painful spot the woman complained of,) and by the effusion of lymph, the walls at this part were greatly thickened and hardened, and the formation of the sac completed and strengthened. Viewed externally, *i. e.* when removed from the body, the existence of the sac presented a very obvious appearance, Plate I., Fig. 1. Just below the sac, the œsophagus was somewhat contracted, but immediately regained its natural width.

The epiglottis was natural in its appearance, but all the parts surrounding the laryngeal opening were very œdematous, and of a peculiar rosy tint. On splitting up the trachea, it was seen to be considerably contracted between the wings of the thyroid cartilage, the membrane had a redder tint than usual, several flakes of lymph were adherent to the sides, and a deposition of the same substance had apparently taken place beneath the mucous membrane, giving it a thickened and pulpy appearance. Such were the appearances observed in the part which was removed.

Much frothy mucus, tinged with blood, flowed from the divided trachea. The lungs were very crepitant, and contained a great quantity of frothy matter. Extensive adhesions existed between the *pleura costalis* and *pulmonalis*. The pericardium contained about an ounce of bloody serum. The right side of the heart contained a considerable quantity of dark blood; the left was empty. The stomach and lower part of the œsophagus presented nothing remarkable. No abnormal appearances were seen in any other part of the body.

The brain was not examined.

Remarks.—While conducting the *post mortem* examination of this case, I learned for the first time, that, besides the attempt this woman had made to hang herself, she had also attempted suicide, by forcing the poker down her throat. Her determination to self-destruction appears, therefore, to have been of a most decided character. And, when we reflect upon the length of time she had the fortitude to bear the pressure of such a body in her throat, and, especially, when we consider she so easily could have had it removed by making an avowal of its being there, or simply, by slipping back her fingers and extracting it, (for I am inclined to believe she could have done this,) it forms, perhaps, one of the most remarkable cases of determined suicide on record. The horror arising from suicide so effected is almost lost in admiration at the determined character and strength of mind displayed by this unfortunate woman.

Examples of persons committing suicide in ways the most deliberate, are frequent enough ; but the peculiar manner in which in the present case it was effected, and the length of time so great an amount of suffering was endured, are rare.

We generally find in individuals of sanguine temperament, plethoric habit of body, and subject to sudden passions, that suicide is committed in moments of despair, and in a violent and sudden manner ; while, on the other hand, those of a melancholic temperament, and spare habit of body, are generally the victims of a death of a more deliberate kind. Remer, Davarn, Esquirol and others, mention cases of this kind, where, although the death itself was violent, the mind had long been made up to it. What fortitude must have been shown in the case where 200 leeches were applied to the abdomen to cause death ;* not less in those cases, where, from the knowledge of the situation of certain large arteries, these have calmly been opened for the purpose of self-destruction ;† and, likewise, in those cases related, where, in drowning, the suicide had previously tied weights to the body, or the limbs together.‡

Such cases as these, but more especially the one which has just been related, can only be considered as distressing examples of that species of suicide, arising from what Foderé calls melancholy delirium, in which the person has been for a long time accustomed to deprive himself of the rights of nature, and, who sees not only his last hour without a groan, but is displeased with whatever would retard its approach.§

This case, when considered in a medico-legal point of view, might be regarded as one of suicide, of accidental death, or of homicide ; not only are arguments strong in favour of the first of these, but they are corroborated by striking facts. Her former attempts at suicide, the nature of her moral and physical constitution, her melancholic temperament, her depraved manner of life, the absence of any motive on the part of her friends to wish her death, but, above

* *Lancet*, Vol. ii. p. 103.

† *Edin. Med. and Surg. Jour.*, No. 134, &c.

‡ *Dict. des. Sc. Med.* Vol. xxiv. *Annal. d'Hygiène*, Vol. ix.

§ *Dict. des Scien. Med.* op. cit.

all, the evidence of a young woman who had seen her on the evening of the day the occurrence took place, and who had heard her declare with an oath, that she had swallowed the cellar key. This young woman I had not seen till after Mrs A——'s death. Now, had it not been for this evidence, strong suspicion might have existed, that the unfortunate woman had swallowed, or rather pushed the key down her throat in a moment of frenzy, and forgotten the matter afterwards. But, it hardly can be supposed, that the presence of a key of such a size, could have remained in the position it occupied, without causing a sensation of its presence.

The idea of the case being one of homicide is negatived by the absence of all those marks which we would naturally have supposed to be present. There would have been marks of violence about the mouth, probably injury to some of the front teeth, and, at all events, laceration or contusion of some part of the pharynx or œsophagus. Now, all these being wanting, prove, that the key must have been cautiously introduced, and with the view of avoiding pain, a consideration of little import to a homicide. The purpose, too, had been firm, for, from the position of the key, and from its size, it is evident, the fingers, or some other medium must have been employed, in pushing it down the œsophagus.

CASES SHOWING THE NATURE OF BODIES WHICH HAVE LODGED IN THE ŒSOPHAGUS OR PASSED INTO THE STOMACH.

The capacity of the œsophagus, if I may so call it, to allow the passage of large and sharp bodies along it, is in some cases remarkable, without apparent injury to any part of it, or without causing any urgent symptoms. Thus, there is related, a case of an idiot boy, in whose stomach were found 38 pieces of various substances; amongst these two compasses and a knife.*

Fournier records the case of a galley slave, whose stomach contained a piece of staff, 19 inches long and half-an inch broad; two pieces of broomstick, 6 and 8 inches long; 22 other pieces of wood; a pipe of an iron funnel, 3 inches by 1; two pewter spoons, one 7 inches long, and other substances.†

I may also allude to the cases of men and women, who, in all countries, make a profession of swallowing extraordinary substances, as illustrative of what can pass down the œsophagus. One of these persons died a few years ago in Guy's Hospital, in whose stomach were found twenty or thirty portions of knives and forks.‡ Dr Harrison records the case of a maniac, in whose stomach he accidentally found several curious metallic substances, as large rusty nails, pieces of iron, a blade of a knife, a buckle, a hinge of a door, &c. &c.§ Borelli gives an account of a pantophagist, who swallowed at one meal a hundred louis d'or, rather an expensive repast. || In America, a young man swallowed one day fourteen knives; this, however killed

* Phil. Trans. Jones' abridg. Vol. v. p. 278.

† Dict. des Scien. Med. art Cas. Rar.

‡ Med. Chir. Trans. vol. xii. § Dublin Jour. Vol. viii.

|| Borelli, Cent. i. ii. iv. &c.

him; one of the knives was found in the œsophagus. The same youth had some time previously swallowed a gold watch, chain, seals and all; he evacuated them on the 9th day.* Many similar cases, might be mentioned;† but I deem those sufficient to exemplify the kind of bodies which can pass down the œsophagus, and also to prove, what I am about to state, namely, that large, and even sharp bodies, often pass down the œsophagus with impunity, while small ones are frequently detained, and produce immediate and serious consequences.

We are told of a child, where an ear of rye, stuck in the œsophagus, and produced immediately severe symptoms of suffocation and convulsions. These, however, gradually disappeared, and it was discharged by abscess.‡ Dr Cleghorn of Dublin, mentions a case where a quill stuck in the œsophagus of a girl, and quite deprived her of her senses.§ A morsel of potato engaged in a sac in the œsophagus for three hours, produced the most imminent danger of suffocation.|| M. Dupuytren was called to extract a five franc piece which had been lodged in the lower part of the pharynx for twenty-four hours.¶ Mr Davy of Kent, relates a case where a half-penny remained for thirty-nine days, four inches down the œsophagus. The irritation it caused was excessive, and prevented its extraction sooner.** Wanderbach mentions the case of a soldier, where a leech having fixed itself in the œsophagus, remained for a fortnight, and caused a tumour to be formed, which produced very great difficulty of deglutition and respiration.†† Guattani relates, that in 1738, Gousard, a surgeon in Limousin, had to perform œsophagotomy, for the removal of a bone one inch long and half-an inch broad.‡‡ And, according to Morand, a like operation was performed by Roland, a military surgeon.§§ Similar cases where this operation had to be performed for the removal of small bodies sticking in the gullet, are related by Sir C. Bell, |||| M. Begin, ¶¶ Dr Arnott, *** and others. M. Habicot mentions a case where bronchotomy had to be performed, from the pressure of a parcel of pistoles lodged in the gullet.††† Benjamin Bell remarks, that he has met with several cases of foreign bodies in the œsophagus, which produced death, and where, in his opinion, had bronchotomy been performed in time, it would have been effectual.‡‡‡ A boiled chestnut, lodged in the œsophagus, caused death in nineteen days; the patient, a soldier, was not aware of its presence.§§§

I have been favoured by Dr Handyside with short details of the following three cases of foreign bodies in the œsophagus, from among the preparations contained in his valuable pathological museum, and also the sketch of case 3d, Plate I., Fig. 2.

* New York Med. Repos. 1822.

† Vide Ephémérides, Dec. 2, ann. 10, Cent. 9, Art. Med. Societ. Berlin, p. 350.

‡ Lancet, Vol. I. 1830, p. 350.

§ Rees Cyclop. Act. Suff.

|| Lancet, Vol. ii. 1835.

¶ Ibid. Vol. I. 1830.

¶ Ibid. Vol. ii. 1838.

†† Jour. Univer. des Sc. Med. January 1828.

‡‡ Mem. de l'Acad. de Chir. Tom. iii.

§§ Cooper's Surg. Dict.

|| Lancet, Vol. xi. 1832.

¶¶ Med. Chir. Rev. Vol. xix.

*** Ibid. Vol. xx.

††† Mem. de l'Acad. de Chir. Tome xii. p. 243.

‡‡‡ B. Bell, Surg. Vol. v. 137.

§§§ Guattani, op. cit.

"1st, *A padlock removed from the posterior wall of the pharynx of a woman, aged 23, having been imbedded there for six weeks, (P. a. 7.)*—The padlock, for the purpose of being concealed, was hastily introduced by the patient into her mouth, whence it fell accidentally into the pharynx. The patient concealed the fact. The foreign body excited, however, violent fits of coughing, and considerable febrile disturbance. From these symptoms she recovered after the lapse of three days, and continued comparatively free from suffering, till the expiry of a week, when the ulceration excited by the presence of the padlock in the pharynx caused her to be admitted into the Royal Infirmary. Here she remained for five weeks under the care of Professor Lizars and the other surgeons; but it was not thought to be advisable to attempt any operation for its removal.

"As the ulceration extended the padlock became somewhat detached, upon which the violent fits of vomiting returned. During one of these fits the padlock was thrown upwards into the mouth.

"2d, *A mutton bone found after death imbedded in a sloughing abscess situated within the posterior wall of the pharynx, (P. a. 3.)*—During the life of the patient this foreign body could not be detected, either with the assistance of the finger or of probes.

"3d. *Large brass curtain ring permanently imbedded in the pharynx.*—An infant, nine months old, while playing with the ring in her mouth unperceived, allowed it to glide into the pharynx. Alarming symptoms of suffocation immediately presented themselves, but these ceased very shortly. At the time that the accident happened, Mr Glover, surgeon, who was called, introduced his finger into the throat, but without discovering any foreign substance. At the age of four years the patient died, of hydrocephalus, when, on inspecting the pharynx, the brass ring was found lying horizontally across the pharynx, being bound down latterly by two strong bands of lymph." (See Plate I., Fig. 2.)

Professor Fergusson relates a case, communicated to him by Dr Little, where a gentleman, in an epileptic fit, swallowed five false teeth, with their gold settings. From the symptoms, &c., it is probable that the teeth lodged in the lower part of the œsophagus for several years.*

These cases show well how uncertain any one can be of what may or may not pass down the œsophagus into the stomach, or be arrested in the gullet; and, if we look for a moment at the treatment in cases of arrest of bodies in the gullet, it will at once occur to us, to be our immediate duty to get rid of them if possible, either by extraction, or by pushing them down into the stomach. But sometimes both of these methods are inadmissible, while, at the same time, the symptoms and danger of suffocation are most urgent. In such cases our only resource is to open the œsophagus and extract the body, or we must afford temporary relief by bronchotomy. Sometimes, however, foreign bodies remain imbedded in the œsophagus, without causing any very urgent symptoms, or preventing deglutition; in these

* Fergusson's Surgery, p. 409.

cases generally sooner or later they become loosened by ulceration, and are then easily extracted. Or, as in some cases on record, they are removed by ulcerative absorption, and present themselves beneath the skin at various parts of the body. Tartar emetic has been injected into the veins for the purpose of exciting vomiting, in order to eject the body, and with success. * But the danger of this method, as also that of forcing the foreign body into the stomach with a probang, is very evident, and such practice has been known to produce fatal inflammation, hemorrhage, and gangrene. †

The *post mortem* examination of the œsophagus of Mrs A—— explained the manner in which the key had been arrested at that particular part of the gullet. It might seem strange it was stopped in the place mentioned, for the broadest part of the key had passed the narrowest part of the tube; but, it appeared, as I have already stated, that, a portion of the lining membrane had been caught by the handle of the key, and, had been pushed in such a manner before it, as to form a sac, preventing its further descent. This manner in which foreign bodies are detained in the œsophagus is not common; indeed, I am not aware of any similar case. It would almost seem that the sac here could not have been formed by one push of the key, but, that, from the natural resistance given by the œsophagus, and other parts of the throat acting in sympathy with it, the introduction of the key had been several times resisted, but, by the persevering attempts of the suicide it had at length been pushed beyond the immediate reach of her fingers, and that, by the frequency of these attempts, the fold of the lining membrane had been gradually detached from its connections, and assumed the position it did.

Suicide by the introduction of foreign bodies into the œsophagus and pharynx is by no means a common occurrence. Cases, however, do occasionally occur. I remember of seeing, some years ago, a case of this kind in Dr Handyside's anatomical rooms, where death was produced by a ball of soft cotton wedged into the pharynx. The case was published by Dr Handyside.‡ Another case is said in the same paper to have occurred about five years ago in Edinburgh. Professor Wagner relates a similar case, where a shawl had been stuffed into the pharynx, and caused death.§ Reydelert refers to negroes swallowing their tongues to cause death, and thus remove themselves from slavery. He, however, puts little credit in this statement.|| Dr Gordon Smith mentions the same fact;¶ and the Rev. Dr Walsh gives a case in point, where, in a negro who was ordered to be flogged, his tongue was found wedged in the œsophagus, so as completely to close the trachea.** Dr Horner of Philadelphia, however, questions the possibility of doing this, and denies ever having

* Pfaff's Mittheilungen, 1835, 54.

† Vide Delpsch Précis Elementaire des Mal. Rep. Chir. Hevin de l'Acad de Chir. Trans. 144.

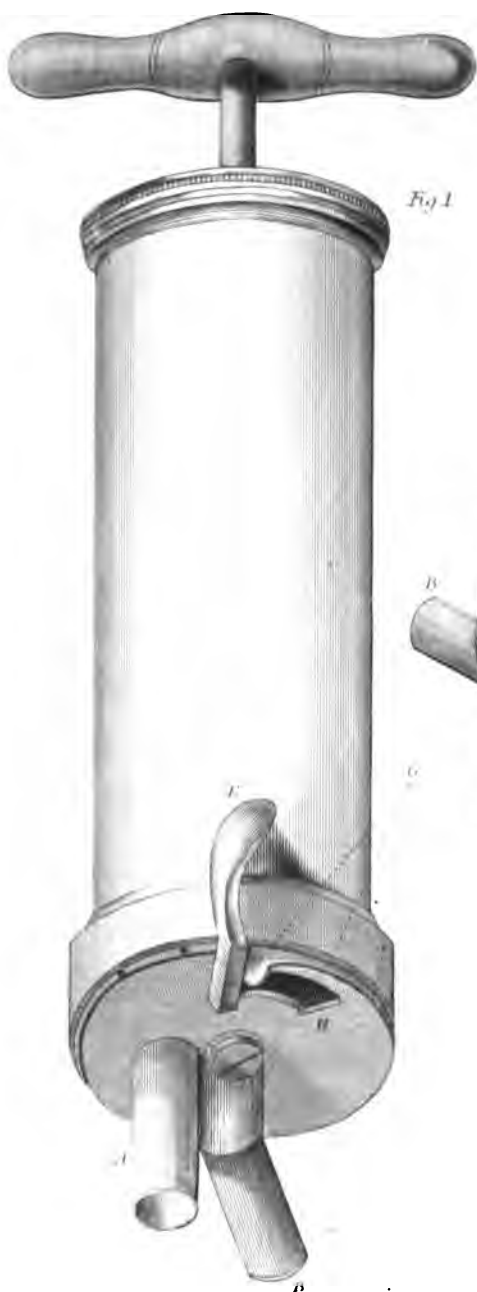
‡ Ed. Med. and Surgical Jour. Vol. lvii. No. 151.

§ Lond. Med. Gaz. March 29, 1834. || Dict. des Sc. Med. Art. Suff.

¶ Smith, p. 231.

** Walsh's Notices of Brazil, Vol. ii. p. 197.

D^r H. Graham's improved Stomach Pump.



heard of it, though he has passed many years among a negro population.* (Beck, Med. Jurisprudence.)

It is a matter of speculation interesting to consider, what would have probably been the result had the key been extracted the day I first saw the patient, i. e. the day after she swallowed the key. I mentioned that a fold of membrane had been pushed down so as to form a sac; now, if we reason from analogy, we find that the existence of this sac, when the key had been removed, might have proved fatal. A cherry-stone was swallowed, and lodged in a fold of the pharynx for three days; when it was discharged, a small sac had been formed by its presence, and this sac, by degrees, became larger and larger from the passage of solids and fluids, so that, it soon attained an enormous size, producing finally great dilatation of the œsophagus, and fatal dysphagia about a year afterwards.† Again, had the key not been extracted till after the formation of the ulcerated spot already mentioned as extending through all the coats of the œsophagus, we have the authority of Sir C. Bell‡ for supposing, that the food or drink, by gradually inserting itself between the coats of the œsophagus, might have formed a similar sac, and might have had a similar fatal termination.

The key on being measured was found to be exactly four inches in length, one inch broad at the wards, and one inch and a-half at the handle. It was a common iron cellar key, black colour, and very slightly corroded. There cannot be the slightest doubt, that the key did actually remain in the œsophagus all this time, viz. from the 3d February to the 2d April, a period of fifty-eight days. The *post mortem* appearances sufficiently indicate this, as well as the fact, that the key which was required to open the cellar door could not be found.

It is evident, from the manner in which Mrs A—— died, and from what she was capable of doing when alive, that her death was not occasioned by what is properly called suffocation; neither does it appear, that she died from dysphagia or want of nourishment; but, it rather appears, that the fatal event was produced, partly, by exhaustion from irritation to the bronchi and lungs, producing the copious expectoration alluded to, and, partly, from the gradual mal-oxygenation of the blood, from the œdematous state of the larynx and laryngeal opening, and the blood thus degenerated, acting upon the brain and other important organs, produced the fatal termination of this curious case.

Dispensary, Quality Street, Leith, May 1843.

ART. X.—*Notice of an improved Stomach-Pump, &c.* By
DR HENRY GRAHAM, Edinburgh.

IT has occurred to me that some of the imperfections of the stomach-pump and enema-syringe in common use, and furnished with ball valves, might be obviated by adapting to the instrument a prin-

* Amer. Jour. of Med. Sc. Vol. ii. p. 182.

† Med. Obser. and Inquir. Vol. iii. p. 85.

‡ Lancet, op. cit.

ciple somewhat resembling that of Shaw's pocket bugle, or of Syke's powder flask.

It is always difficult to keep the valves of the stomach-pump in perfect working order, so as to be ready at a moment's warning, and the enema syringe being now met with in almost every family, it is a matter of importance to diminish, as much as possible, the chances of its getting out of repair, particularly as, unless considerable care is bestowed in cleaning it most thoroughly after being used, the valves are very apt to be found clogged, adhering, or not air or water tight on the next occasion.

The advantages which the present suggestion seems to me to possess are ;

1st, There being no ball valves which can become obstructed or rendered incapable of acting by solid or viscid matters passing into or from the syringe.

2d, There being a perfectly open tube, unobstructed by a valve of any kind during the ingress and egress of the fluid, &c. into and from the syringe, portions of comminuted food and other solid matters may be abstracted from the stomach, if they are small enough to enter the œsophagus tube. The latter, by the way, I would propose, should be made rather wider in its calibre than those at present in use. This could be done, I am confident, without inflicting any additional inconvenience upon the patient.

3d, It is not necessary to alter the position of the syringe and tubes in the least, when it is wished to *reverse* the action of the instrument, as in injecting the stomach and afterwards withdrawing its contents, or *vice versa* ; all that is requisite being merely to reverse the motion of the thumb of the left hand.

In order to explain its construction, I shall refer to the etching of the instrument. The syringe itself may be seen at the shop of Mr Young, cutler, Princes Street.

A B, two short brass tubes, (B being bent at a right angle,) for the insertion of the œsophagus tube and side pipe.

C, a metal plate, accurately ground to the internal surface of the bottom of the syringe, revolving on a centre, and perforated by an opening, which, according to the position of the plate, corresponds either to the tube A or B. (The dotted circle D, denotes the situation of the orifice of the tube A.)

E, a thumb piece, attached to the revolving plate by the screw F, and which, after being pressed down to H, and the syringe filled from A by drawing up the piston, is restored to its position at E by the spring G, thereby opening the tube B for the discharge of the contents of the syringe.

It is obvious, that when it is wished to change the action of the instrument, from injecting the stomach to discharging its contents, or the contrary, all that is necessary is to *reverse* the movement of the thumb-piece, with reference to the action of the piston.*

* We have examined this simple and ingenious contrivance, and think that it is extremely well adapted for the purpose intended, and for obviating the inconveniences and objections of the common stomach pump.—EDITOR.

PART II.

CRITICAL ANALYSIS.

ART. I.—*On Spasm, Languor, Palsy, and other Disorders, termed Nervous, of the Muscular System.* By JAMES ARTHUR WILSON, M.D., Fellow of the College of Physicians, and Physician to St George's Hospital. 12mo. London, 1843, pp. 201.

WHEN the doctrines of the humoral pathologists began to give way before the advances of the solidists, who pointed out the actual existence of disorganized structures in the solid tissues sufficient to account for the symptoms of disease, the profession at large, instead of calmly examining both doctrines, divided into two great bodies, one of whom maintained that all diseases depended on altered states of the fluids, and of these alone, whilst the other maintained that the cause of the disease lay exclusively in the solids. As the solidists possessed the advantage of being able to render apparent to the senses the lesions in the solid tissues of the frame, besides that theirs was the most *modern* doctrine, they succeeded in rendering it fashionable to the complete exclusion of all the ancient humoral ideas. To such an extent was this carried, that in many of the late works on pathology, the fluids of the body are passed over as unworthy of notice, and some of the most eminent pathological writers do not devote so much as even a single page to the nutrient fluid of the body—the blood.

Prevalent, however, as are the doctrines of the solidists, various writers have with some probability asserted, that the study of the fluids was too much neglected, and that, if the ideas of the old humoral pathologists were not altogether true, truth probably lay between the two contending parties. A very few, however, have gone a step further, and, if we understand them aright, have stated that, if the subject of diseases be more closely studied, it will probably be found that by far the greater number actually depend on an altered condition of the fluids of the body.

Dr Wilson's work, though purporting to consider only the diseases to which muscle is liable, is in some respects a defence of the

humoral pathology, and he endeavours to prove that it is disorder of the fluids alone which is the immediate cause of all the forms of disease of which he treats. In the general remarks with which the work is opened, the author not only condemns the overlooking the state of the muscular structure in all pathological writings, but strongly asserts that many of the affections to which they are liable do not depend on disordered functions of the nerves, to which they are usually attributed, but to direct disease of the muscle itself. A little further on he introduces the peculiar humoral doctrines, and asserts that the blood and muscle are not only identical in their material, but that "there is the closest analogy between the spontaneous contractions of the muscular fibre and the self-coagulation of the blood." We are not informed from what set of experiments such conclusions are drawn. There is no analogy between the composition of blood and muscle, though there is between muscle and one of the minute ingredients of blood, viz. fibrine; there is no analogy between the phenomena of coagulation of the blood and the vital contractions of muscular fibres. Not satisfied with directly contradicting all the established facts relative to the nature and composition of the blood in his endeavour to prove the truth of the humoral doctrines, he asserts that, "in the operation of functional disorder, the blood is not merely passive and subordinate; it originates its own actions,—maintains its own current,—it is self-contracting, self-expanding, like the flesh which it creates;—it is an organ, vital and with a function." He further maintains, that the blood is not only blood and muscle, not only self-contracting, &c. but it is nerve and brain too. "The blood entire is sensitive, as the individual nerve, of external impression, instantaneously and simultaneously perceived through all its distributions; not so the nervous system," p. 86. It is thus seen that the principle with which Dr Wilson sets out is neither proved, nor were it proved, is it of general application.

Setting out, therefore, with this false analogy, he is led almost to identify the blood with muscle, and arrives at his next conclusion, equally erroneous with his first, viz. that "the agents which, for good or for harm, exercise the most rapid and extensive influence on the functions of the muscular system, are those of which the effect is most remarkable in modifying the coagulation of the blood." The author explains what he means by stating that agents which kill by destroying muscular motion, act on the blood by preventing its coagulation. This inference is at variance with many well-known facts, and even with some of those quoted in the present volume. In syncope the blood becomes unusually coagulable—the "faculty of originating motion," as he expresses it, in the muscles, being abolished for the time; whereas, were his theory

true, spasm or rigidity ought to ensue. The effect of poisons also is another illustration ; many which produce death leave the blood fluid, whilst the muscles are unusually contracted—the cadaveric rigidity is unusually strongly developed. In fact, he contradicts himself in express terms a little further on, when treating of tetanus, for there the very phenomena are quoted to prove the very reverse, viz. that when the blood is fluid from disease, the muscles are unusually rigid ; whilst, if any agent acts by rendering the blood very coagulable, that same agent exerts the very opposite effect on the muscular fibre.

Imagining he has proved that the state of the blood directly influences the state of the muscle without the agency or intervention of the nervous system, the author finds no difficulty in assuming as his next proposition, that the muscles react on and alter the state of the blood, “elaborating the great common materials of the body, and preparing it for circulation elsewhere.” It would be difficult to find a greater number of erroneous propositions or conclusions in such a short space in almost any work. In the remaining part of his general remarks, he constantly confounds muscular irritability and tonicity, with vital and voluntary contractions. It is well known that muscular irritability remains after the nerves leading to the muscle are divided, nay, after all supply of blood is cut off,—after it is beyond the control of the will and circulation, when separated from the living body ; and lastly, the last expiring effort of this irritability or tonicity is seen in the cadaveric rigidity of the limbs after death. All these states are independent of the will, independent of volition, independent of nervous influence, independent of the circulation, and ought never to be confounded, as the author appears invariably to do, with voluntary muscular action. This is evidenced from what is occasionally seen even in palsied limbs—limbs which, by disease of the nervous centres, are deprived of all nervous agency. In these limbs spasms occasionally are observed to occur, and the author, in one of his chapters, actually relates a case in point. The irritability—the characteristic property of muscular fibre remains, and may, on any irritation, directly or indirectly, applied to these fibres, be excited so as to throw the muscles into irregular spasmodic contractions. Had the author attended to this distinction, he would have rendered his work of some utility by directing the attention of the physician to the connection between certain pathological states and the occurrence of irregular muscular action, deprivation or exaltation of the powers of voluntary contraction, or loss of these last with exaltation of the organic irritability.

Cramp, spasms of the chest and stomach, of the diaphragm, of the trunk and limbs, spasms of infants, &c. are all considered by

the author as disordered action of the voluntary muscles, in most cases induced by an alteration in the nature of the circulating fluid. He endeavours to combat the idea of spasmodic affections being necessarily dependent on irritation of the nerves, by instancing a few cases of diseases of the nervous centres where no spasmodic action of the voluntary muscles was observed during life.

Dr Wilson further states, that "spasm or cramp is seldom occasioned by direct pressure or irritation of the nerve of the affected muscles; and never, I believe, by irritation conveyed to them from the nerves of more remote structures independently and exclusively of the effort of such irritation on the circulation and general structure of the muscle. It is from what offends the blood in the fibre that spasm of the voluntary muscles is for the most part induced." If such were the case how, we would ask, does disease of the brain cause spasms and convulsions? How does the pressure of the child's head during parturition so very frequently produce cramp by pressing on the nerves as they lie in the pelvic cavity? If it be attempted to be shown that it is not from pressure on the nerves but from retarded circulation by pressure on the blood-vessels, how could tying a ligature tightly round the leg frequently remove the cramp? On this principle the ligature ought to increase the cramp, but it is known to have the directly opposite effect. Let us take another instance, locked jaw. The hand or foot is injured, and shortly afterwards, sometimes after the wound is healed, stiffness about the jaw commences, and increases till locked jaw is produced. The irritation applied to one part of the body has been somehow communicated to a distant part with which it has no apparent relation. Dr Wilson attributes this to diseased blood; but if such were the case, the blood, being universally distributed, would equally affect every voluntary muscle of the body, as we see in poisoning by strychnine, &c. It would never cause one single set of muscles to be affected, and these a set of muscles not directly injured, if the cause were one pervading the whole circulating fluid. We are forced, therefore, to reject as untenable Dr Wilson's supposition,—a supposition which rests solely on his assertion,—even though we may not be able to give a satisfactory explanation of the phenomenon.

It is the same with cramp, though it and tetanus are the very instances given by Dr Wilson as proving his point. Cramp is most common in the growing youth; it affects chiefly the muscles of the legs, and most usually attacks during the night. Now is it probable or possible, that such a complaint could depend on a vitiation of the blood, and yet limit its operation to the muscles of the leg, often to the muscles of one leg only? But cramp in the legs is a very frequent consequence of continued over-exertion in walking or running, but it affects the over-fatigued muscles

and them only. Neither spasm nor cramp, therefore, can depend on a vitiation of the blood, else the spasm would be universal, as we see it always more or less so when induced by the introduction of poisonous agents into the circulation.

Pathologists and physiologists appear to have overlooked the fact, that spasms or cramps of all kinds are produced by an excitement of the natural irritability and contractility of the muscular fibre. The painful sensation, however, appears to be induced from that contraction taking place irregularly, and in all probability compressing and otherwise injuring the nerves. When the muscle is in a state of spasm or cramp the will has no power over it; volition is not conveyed to its fibres; of course voluntary contraction cannot ensue. This of itself proves that the nerves have nothing to do in many cases with its causation; and such a result we know, from ascertained physiological experiments, can take place on the application of any irritation or stimulus to the muscle, whether deprived of its nerves or removed from the body. The same experiments prove that the presence of a stream of circulating fluid is not necessary to the production or development of the organic contractility and irritability of the muscle, for it retains it for hours after being removed from the body, and in the dead animal.

Physiologists and pathologists have therefore yet to distinguish between that form of spasm or cramp which arises from irritation of the nervous centres, or of the roots or other parts of the nerves, and that caused by some local irritation in the muscle itself. The diagnosis is of no mean importance, as on it depends the success of the remedies employed for the removal of the affection. But there is yet another form which Dr Wilson has pointed out, viz. from a diseased condition of the circulating fluid in consequence of diseased kidney. This, however, ought to be ranked with that form caused by poisons, as the circulating fluid contains a noxious poison in both cases, and, instead of the spasm or cramp being local, it is general, and ought more properly to be termed convulsions, and is always much more serious than simple spasm.

Spasm or cramp, then, instead of being limited to one cause, most undoubtedly depends on at least three distinct states. 1. Local irritation of some kind, as seen in common cramp of the limbs, or in colic; 2. Irritation of the nervous centres, or origin or other parts of the nerves distributed to the muscles, as seen in the epileptic paroxysm, cramps and convulsions during parturition, and perhaps it might be added in tetanus; and 3. from the introduction of a poison into the blood, as in lead colic or palsy, excess of urea in blood, poisoning by strychnia, &c. With reference, however, to the spasms or convulsions which often occur during parturition, one word is requisite. Dr Wilson asserts

they are rather to be attributed to "material changes in the general mass of the blood," than to local irritation of the nerves, or a supposed condition of fulness and inordinate action in the vessels of the brain. From our own experience in this disease the convulsions would appear to be attributable to at least two causes. *Firstly*, and this is the most curable form, to congestion within the brain,—a congestion almost always connected with diseased heart, as we have ascertained from a few *post mortem* examinations; and *secondly*, from the existence of diseased kidney and the presence of urea in the blood. This appears, on the whole, to be the most fatal form. Perhaps some degree of congestion of blood within the brain is the more immediate cause of the production of the convulsions, which once established, rarely leave the patient till death closes the scene, when the kidneys are found diseased and urea very generally exists in appreciable quantity in the blood.

Such are the results to which pathological investigations have led; and it is only by comparing accurately the symptoms during life with the appearances found after death, that we can hope to advance the science of medicine.

The two succeeding chapters of the author's work purpose to contain the "general treatment of spasm," and the "treatment of spasm when complicated with glandular disease," but, except in condemning the recognized modes of treatment, not a word is said of the author's practice, or what means he would recommend as a substitute for the one of which he disapproves.

Spasmodic cholera, we are told, "has done great good to physic;" and we are led to infer that this good has been effected by teaching the profession that the blood is the agent primarily diseased in that malady. Dr Wilson accordingly adopts Dr Stevens's views relative to this point, and lauds the "neutral non-aperient salts" as agents which act "as antidotes to the cholera poison while yet circulating in the blood." That the spasms are caused by diseased or poisoned blood is not improvable. But they may be caused also by the excessive drain from the vascular system. The spasms or affection of the muscular system are universal; they are not limited to certain muscles, they are therefore dependent on some general and pervading cause. The analogy of poisons introduced into the system teaches that the cause producing the spasms must be universal—must consequently exist in the blood. We know the blood is altered in nature in this disease; but whether it acts on the muscles through the brain and nerves, or more directly on the muscular texture itself, has not been satisfactorily ascertained. The experiments of Longet and other late experimentalists, however, enable us to understand that the diseased blood may act in both of these ways on the muscular structure. By acting as a poison on the great nervous centres

it deprives the muscles, more or less, of the power of voluntary motion; then, by acting as a direct irritant on the irritable muscular fibre, it excites its irritability, (which the experiments of Longet prove does not depend on its nerves,) and excites it to irregular and painful involuntary contractions.

Tetanus is stated to be owing to a diseased state of the blood, but the evidence or facts on which such an assumption rests are not stated. It is assumed, however, that the blood must be fluid in this disease, chiefly on the vague belief that this disease ought to be the opposite of syncope, in which the blood is unusually coagulable, whilst the muscles are relaxed; whilst in this complaint, from the muscles being unusually rigid, it is inferred the blood must be unusually fluid. Far, however, from even his own cases bearing him out in this gratuitous assumption, the author is forced to allow that the blood was not only occasionally "well set," but that it was "buffy"—"exhibited the buffy crust;" and the numerous cases of tetanus which have been recorded prove that the blood exhibits no unvaried state of fluidity. As no facts are narrated which tend to throw any additional light on this disease it seems unnecessary to enter further into the peculiar views held by the author. Though he considers tetanus to be "the muscle-fever of pathology" and depending on a poison in the blood, and unhesitatingly condemns the present modes of treating the disease, he is able to suggest nothing better but that "the antidote to strychnia would be the cure of tetanus." If strychnia were the poison producing tetanus this would be true; but our knowledge of vegetable and mineral poisons enables us to understand that different agents may produce somewhat similar effects on the living animal body, and yet be very far from being amenable to the same antidote. We would condemn as much as the author does the theory relative to the treatment of this disease. It ought ever to be recollected that the spasmodic affection which is present, and which seems to be the more immediate agent in producing the fatal result, is not the result of nervous agency. It depends on an exaltation of the natural irritability and contractility of the muscular fibres, properties which are now fully proved to be independent of the nervous influence. If we knew the cause of the irritation which produced this disordered action in the muscle, we could with greater certainty point out a remedy; but having to trust, at present, merely to the fact, that such a state of the muscle exists, blood-letting and other antiphlogistic means, tartar emetic in nauseating doses, &c., as being the agents which possess most power in lowering muscular irritability, seem those more especially indicated in this disease.

Chorea, the next disease of which Dr Wilson treats, is also referred to a diseased state of the blood, and regarded as "a fever;"

the chronic forms to the "undue relations between the blood and fibres of the entire muscle." Now, without denying that the blood, in consequence of the affection of the general health, may, to a certain extent, be diseased, it may with perfect safety be affirmed that this fluid is not the only part of the system affected. If the diseased blood were the cause of chorea, the spasmodic affection would be exhibited by night as well as by day, because the same blood would be bathing the same muscles. But the very fact that sleep constantly puts an end to all the spasmodic affection in that disease proves, beyond the possibility of dispute, that the nervous system itself is somewhat involved in the production of the malady. But besides all this, how often do we see symptoms not to be distinguished from chorea produced by the irritation of worms, more especially of the round worm, and removed on their being discharged. Notwithstanding the author's peculiar views of the nature of chorea, he does not suggest any other remedial means than those usually employed,—bleeding, purgatives, and tonics, with attention to the diet, being the agents used by him as by others.

Some observations on the abdominal muscles, on the effects of dress on certain muscles of the frame, on the muscles of the throat, on muscular pains, and on lumbago and sciatica then follow; but nothing requiring particular notice is communicated.

The remainder of Dr Wilson's work treats of sleep, mesmerism and magnetic sleep, languor, palsy, baths and mineral waters, exercise, and a concluding memoir on fatal convulsions, with renal disease. Here the author informs the reader that "sleep is a function, of which the voluntary muscles are the organ," and that "it is not enough that our limbs should rest; if they do not sleep, we die." It seems that henceforth we are to believe that "we fall asleep by a distinct muscular act, and thus are enabled again to awake." That "it is by a continued influence on the muscle—by a something done in its fibre,—that sleep is prolonged." Above the author endeavoured to show that the blood performed the function of the nerves; here we find that he asserts the muscle performs the part of the brain. But how do the muscles produce sleep? By the "periodical accumulation and diffusion through the muscles by the blood of carbonic acid gas." It will thus be seen that the physiologists who have lent their aid to the extension of science for the last thirty years, have, in as far so Dr Wilson is concerned, lived in vain. Because carbonic acid gas, as one of its poisonous effects, produces coma, it by no means follows that it is the agent which produces sleep. Convulsions and an indefinable sense of alarm and sense of suffocation, are just as common premonitory symptoms of the poisonous action of this gas, but we never find natural sleep so introduced. It would have been just as plau-

sible, and nearly as true, to have assumed the formation of morphia in the blood to account for the phenomena of sleep, as to attribute it to the action of carbonic acid on the muscles.

In his remarks on palsy the author appears to be rather behind in his knowledge of the pathology of the disease. Palsy in all its forms, local and general, has received the greatest practical benefits from pathological researches, and to give these up for any theoretical and untried opinions would be highly culpable. Dr Wilson's opinion is as follows :—

“ Palsy of the muscles, unless when following immediately on external injury, always implies a state of previous disorder in the health ; which, after the invasion of the symptoms, may still continue to exist, and should, in the treatment of each case, be carefully and specially considered. The causes of hemiplegia are many and various ; mechanical it may be, or progressive in their action, —local in the limb, or general in the constitution. By preventing their recurrence, as by redressing their effect, we enable the paralyzed muscle again to find its contractility in the healthy process of its own nutrition. And here it will be remembered, that the muscle, by one of its parts, is organized in the brain, and there subjected, as in its fibre, to all influences, whether of damage or repair that affect the common business of growth. Thus it is by a fresh inoculation of its nerve with a sounder portion of the brain, that in the sequel of cerebral hemiplegia the muscle at length recovers, by a renewal of its structure, the completeness of its function.”—P. 62.

Though the author appears to have very confined notions of the difference between the organic inherent property of the independent muscle termed irritability, and that contractile action excited through an act of the will by means of the nerves, he appears to have arrived at a just conclusion relative to the employment of strychnine in paralysis, in as much as, though it does occasion partial irregular movements, it “ is yet powerless in the fibre for its healthy contraction.” As we now know that the irritability of the muscle and consequent spasmodic contraction is independent of the agency of the nerves, and as we know that paralysis, at all events hemiplegia and paraplegia, are almost always dependent on structural disease of the nerves or nervous centres, it is not reasonable to expect that a remedy which acts as a local stimulant to the organic irritability of the muscle can ever remove the cause on which the paralysis of the muscle depends. It is very different, however, when the paralysis depends on the general state of health, on the presence of a mineral poison, as lead, in the system, or on local causes affecting chiefly or solely the muscular structure. In such cases, it is quite rational to expect good effects from strychnine and analogous agents which act specially in exciting the organic irritability. It is in such cases, and in such alone,

that any benefit has been seen to follow the employment of strychnia in our own practice. In all those cases depending on organic disease of the nervous centres, no beneficial results have ever followed its employment, which could not be attributed to the other remedies employed along with it ; and many cases succeeded quite as well when no strychnine whatever was employed.

The above statements will enable our readers to understand the nature of the speculations in which Dr Wilson indulges, and the peculiar views which he entertains on physiology and pathology.

We do not mean, nevertheless, to assert, that the doctrines of Dr Wilson do not present something plausible. Various facts, isolated perhaps, and requiring further inquiry, are rather favourable to the idea that the blood is not quite in a healthy state in several spasmodic disorders. Thus slowly approaching asphyxia, and various other states in which the blood is not thoroughly aerated, in other words, is charged with carbon or carbonic acid, are occasionally attended with convulsive and other spasmodic motions. While we admit this state of the blood, however, we do not say that it is the cause of these motions. That point would require to be investigated and illustrated more fully than it has hitherto been ; and, if Dr Wilson will reconsider the subject in this view, and corroborate it by further proofs, his doctrines will be entitled to greater attention than we think in the present state they can receive.

The most useful part of the author's work is a short memoir, with which it terminates, on fatal convulsions with renal disease, read, we are informed, before the College of Physicians in 1833. The facts there stated are now so fully recognized, in consequence of the able writings of Bright, Addison, Christison, Prout, Rayer, and numerous other physicians, who, in addition to the plain fact, which is all that Dr Wilson states, mention also the cause, viz. the accumulation of the poison of urea in the blood, that it is unnecessary to allude farther to them. Strange it is that the author has overlooked this cause, especially since, from quoting Dr Christison's opinion on one point relative to this subject, it appears that he is acquainted with that accurate observer's writings.

ART. II.—*A Practical Treatise on the Diseases of the Testis, and of the Spermatic Chord and Scrotum.* With Illustrations. By T. B. CURLING, Lecturer and Assistant Surgeon to the London Hospital, &c. London, 1848. 8vo. Pp. 542.

In the present work the author gives an account, first, of the anatomical structure of the testis, and then of the diseases to which

the organ is liable, and of the treatment and operations required for their removal or alleviation.

In the first part, devoted to the former of these subjects, Mr Curling gives with clearness, and in sufficient detail, the description of the different parts and textures which enter into the composition of the testis and its appendages.

It is known that the essential part of the testis consists of *tubuli seminiferi*, or very minute tubules, which are very numerous, and radiate from all parts of the circumference of the organ to the centre, or *mediastinum testis*, making numberless convolutions, which progressively diminish as they approach the *rete testis*. Two or more of the *tubuli* being collected together, and invested by a common cellular tunic, form a lobule of a conical shape, with its apex terminating in the *corpus Highmorianum*. The lobules thus formed are not entirely distinct, but communicate with neighbouring lobules, the processes investing them being incomplete. Krause estimates their number between 404 and 484.

The *tubuli* of which they are composed are of a white colour, and uniform in size; but their calibre varies in different subjects, and in different periods of life, and different states of the system. They are larger in young adults, and when distended with semen, than in aged persons, and when the gland is in a state of rest. From a table of measurements made by Mr Gulliver, and published in the proceedings of the Zoological Society, their diameter appears to have varied from the 1.112th to the 1.77th part of an English inch, and from the 1.160th to the 1.100th part of an inch in adults, and in children and infants, from the 1.400th to the 1.230th part of an English inch. Observers, however, vary as to the diameter of these *tubuli*. The average diameter of the uninjected canal is estimated by Muller at 1.18th of a line, = 1.180th of an inch, and by Lauth, 1.185th of an inch. Krause found the *tubuli* when filled with semen to measure about one-twelfth of one line, = 1.120th of an inch, and in old men and youths about 1.16th of a line, or 1.160th part of an inch.

As to their number and their length little seems ascertained. Monro estimated the number of seminiferous tubes at 300; while Lauth made their average number 840. The latter author estimated the mean length of all the ducts united at 1750 feet. The individual ducts he found to vary in length, the mean being 25 inches. Krause estimated their entire length at 1015 feet.

That the membrane composing the *tubuli* is of a mucous character has been proved by microscopic examination; and it is further continuous with the mucous surface of the genito-urinary system. There is no appearance of interlobular substance. The ducts are connected by a loose network of vessels, and consequent-

ly may be easily separated and unravelled. The tubes are usually injected with mercury, and in this state are shown in most anatomical collections. Sir Astley Cooper injected the tubes with size; but of the method which he followed no account is given.

When the *tubuli* are unravelled, they are found to divide and to form numerous anastomotic unions, which increase in frequency as they approach the circumference of the gland. The *tubuli* thus form one large communicating net-work, in which it is impossible to isolate completely either one duct or one lobule. In one instance only did Lauth, who discovered these anastomoses of the seminiferous *tubuli*, find a duct terminating in a blind sac; and this he regards as an exception. Blind sacs have been more frequently found, however, by Krause.

The convolutions of the seminiferous tubes diminish in number as they approach the mediastinum and cease at a distance of from one to two lines, where two or more unite to form one single, straight duct termed *vas rectum*, which joins the *rete testis* at a right angle. The *vasa recta* are very slender, and easily give way when injected. Their calibre, which is greater than that of the seminal tubes, is estimated by Lauth at 1.108th of an inch. Their number Haller reckoned at 20; but it is believed that they are more numerous.

The *rete testis* is formed of a plexus of seminal tubes, which occupies the *Corpus Highmorianum* or *mediastinum testis*. The *vasa recta*, after penetrating the walls of the *corpus*, terminate in from seven to thirteen vessels, which, running parallel to each other in a waving course, and frequently dividing and anastomosing, form the *rete testis*. The mean diameter of these vessels Lauth found in injected preparations to be 1.72d of an inch.

From the upper part of the *rete* thus formed issue vessels in number about twelve or fourteen, but sometimes rising to thirty, which are named *vasa efferentia*. These ducts, which are arranged in conical shape, and hence named *coni vasculosi*, run straight for the space of one or two lines, forming convolutions which become numerous and close as the vessels recede from the testis. Lauth, estimating the average length at 7 inches 4 lines, and their number at thirteen, makes the united length to be nearly 8 feet. After forming the vascular tubes, already mentioned, they successively join one single duct, the canal of the epididymis, at irregular intervals, the intermediate spaces of the duct varying in length from half-an-inch to 6 inches. These efferent ducts are more slender than the canal of the epididymis, and frequently give way under the pressure of the column of mercury.

While the vascular cones form a round bulky mass, which has

been named the head, or *globus major*, of the epididymis, the convolutions made by the efferent ducts form the body and tail, to which also the name of *globus minor* has been applied.

A shut canal or duct, usually attached to the tail of the epididymis, and with a blind appendage or termination, constitutes what has been named the *vasculum aberrans*. The length of this duct varies from 1 to 12 or 14 inches, and it is always more or less convoluted. It is not constant; nor is its use perfectly known. The present author infers that it serves no particular purpose, and that it is a mere diverticulum, or process similar to those observed in the intestinal canal.

The canal of the epididymis as it approaches the level of that body becomes larger, and forms then the *vas deferens* or excretory duct of the testicle. The course, direction, and termination of this tube are well known.

The spermatic artery or arteries, or those which supply the testis, arise either from the aorta immediately below the renal artery, or come off in one trunk, common to it and the renal artery, a mode of origin connected with the site of the organ in the fœtus, when it is placed near the kidney on each side of the spinal column. From the point now specified they descend behind the peritoneum, forming many convolutions and tortuous windings, obliquely across the psoas muscle and ureter, to which each artery gives branches, and, entering the inguinal canal by the internal ring, they are joined with the chord and reach the gland. Their subsequent distribution is described by Sir Astley Cooper in the following manner.

“When the artery reaches from one to three inches from the epididymis it divides into two branches, which descend to the testicle, and its inner side, opposite to that on which the epididymis is placed; one passing on the anterior and upper, the other to the posterior and lower part of the testis. From the anterior branch the vessels of the epididymis arise. First, one passes to its head; secondly, another to its body; and thirdly, one to the tail and the first convolutions of the *vas deferens*, communicating freely with the deferential artery. The spermatic artery, after giving off branches to the epididymis, enters the testis by penetrating the outer layer of the *tunica albuginea*; and, dividing upon its vascular layer, they form an arch by their junction at the lower part of the testis, from which numerous vessels pass upwards; and then descending they supply the lobes of the *tubuli seminiferi*. Besides this lower arch there is another passing in the direction of the rete, extremely convoluted in its course, and forming an anastomosis between the principal branches. The testis receives a further supply of blood from another vessel, the artery of the *vas deferens*, or posterior spermatic artery, which arises from one of the vesical arteries, branches of their internal iliac. This artery divides into two sets of branches, one set

descending to the *vesicula seminalis* and to the termination of the *vas deferens*; the other, ascending upon the *vas deferens*, runs in a serpentine direction upon the coat of that vessel, passing through the whole length of the spermatic chord; and when it reaches the tail of the epididymis, it divides into two sets of branches, one advancing to unite with the spermatic artery to supply the testis and epididymis, the other passing backwards to the *tunica vaginalis* and cremaster."—P. 27.

The spermatic veins issue from the testis in three sets; one from the *rete* and *tubuli*; another from the vascular layer of the *tunica albuginea*; and a third from the lower extremity of the *vas deferens*. The veins of the testis pass in three courses into the beginning of the spermatic chord. Of these, two quit the back of the testis, one at its anterior and upper part; and a second at its centre, and thereafter from two to three inches are united into one. The other column accompanies the *vas deferens*. The veins of the epididymis, issuing from the head, body, and tail, with some from the *vas deferens*, terminate in the veins of the spermatic chord. The veins, after quitting the testis, become very tortuous, and forming frequent divisions and inosculations, constitute the plexus named *vasa pampiniformia*. After entering the pelvis they form one or two veins which terminate on the right side in the *vena cava* inferior, and on the left in the renal vein, though this is liable to some variety. The left spermatic vein passes under the sigmoid flexure of the colon,—a circumstance important to be remembered, in certain morbid states of the gland and its vessels.

Several anatomists represent the spermatic veins to be void of valves; and to this circumstance ascribe the occurrence of varicocele. Mr Curling informs us, that he has several times injected these veins with alcohol, and on laying them open, he observed valves in the larger veins, and found the passage of the alcohol arrested by the valves. Valves are not seen near the testis, or in the small veins forming the plexus, nor did Mr Curling observe them within the abdomen.

The descent of the testicle from the vicinity of the kidney is a singular and important process. Between the fifth and sixth month, Mr Curling informs his readers, sometimes later, the testis begins to move from its situation near the kidney towards the inguinal ring, which it usually reaches about the seventh month. During the eighth month, it generally traverses the inguinal canal, and by the end of the ninth, arrives at the bottom of the scrotum, in which situation it is usually found at birth. In his further account of the mechanism of this process, the author explains the origin of congenital hernia.

On the question of the immediate cause, that is, we suppose, the efficient cause of the descent of the testicle, Mr Curling, advert-

ing to the objections which Hunter, Meckel, and others entertained against the agency of the cremaster muscle,—that its fibres are insufficient to bring the testis lower than the abdominal ring and complete the descent, argues that, as these anatomists were not acquainted with the attachment of the cremaster muscle to the pubes external to the ring, as some agent of considerable force is requisite in the case of the human foetus to bring down these organs in opposition, as is usually the case, to gravitation, and as the same muscle is instrumental in bringing the testis down in certain of the tribe *Mammalia* in the season of heat,—that it is quite natural and reasonable to infer, that the same descent is accomplished by this agent in the human foetus.

In speaking of the functions of these glands, it gives us pleasure to observe, that Mr Curling is the advocate of a much purer and more elevated system of morality, than is too often taught in the pages of physiologists. After adverting to the influence exerted over the development and secretion of these organs by the mental emotions, education, and the moral habits, as well as corporeal activity and muscular labour, he inculcates the necessity of resisting the artificial cravings of a morbid imagination, by all those means which reason and experience suggest, as best calculated to fulfil the object.

After the anatomico-physiological introduction now mentioned, which constitutes the first part of his Work, the author enters on the proper subject of his treatise, which is divided into three parts or sections, viz. Part II. on the Diseases of the Testis; Part III. on the Diseases of the Spermatic Chord; and Part IV. on the Diseases of the Scrotum.

The second part is subdivided into eighteen chapters, on congenital deficiencies, injuries, and diseases of the testes, on affections of the vaginal coat, and on the analogous and heterologous changes incidental to the gland.

Excess in the number of the testes he is disposed to question entirely, unless where the evidence is confirmed by inspection after death. He quotes, however, one case of three testes from Blümener, a German army surgeon, and that recorded by Dr Macann in the Provincial Medical Journal, and in the 59th volume of this Journal. The want of examination after death, however, he considers as a defect even in these cases.

Fatty or fibrous tumours may be mistaken for an additional testis. An example of this, it appears, was furnished by the testis of Dr Monsey, who was supposed during life to have three testes; but dissection showed that one of the bodies believed to be a testicle was an indurated fibrous tumour attached to the *tunica vaginalis*. The parts are preserved in the pathological museum at St Thomas's Hospital.

Absence of one testis, the defect designated by nosologists as *Monorchis*, Mr Curling very properly regards as not in the majority of cases indicating the actual defect of testicle, but merely the fact that one has not descended into the scrotum, or, at most, that one of these glands had from some cause become atrophied. The case published by Mr Paget in the twenty-eighth volume of the Medical Gazette, presents, he thinks, no circumstances which are at variance with the inference, that the deficiency was owing to the latter cause.

A case recorded by Dr Fisher of Boston in the twenty-third volume of the American Journal of the Medical Sciences, furnishes, he allows, a more satisfactory example of the absence of both testes. The deficiency was remarked from birth, nor at the usual period of puberty did the man present the usual characters of that state. He died of pneumonia at 45. On dissection, the skin, dartos, and *tunica vaginalis* were of a natural appearance, but no testes were found in the scrotum. The spermatic chord, which was much smaller than usual in adults, extended into the cavity of the *tunica vaginalis* about half-an inch, and terminated abruptly in a point of lunar shape. The cremaster muscle extended in numerous small fibres beyond the terminus of the chord, which were spread out upon the *tunica vaginalis*. The *vas deferens*, though properly formed and nearly of natural size, had its canal terminating in a blind sac at the end of the chord. The arteries and veins were exceedingly small.

Under the head of Union of the Testes the author notices briefly the case communicated to M. Geoffroy St Hilaire by M. Breton of Grenoble, and which took place in an infant born at Vizille in 1812. The testes were united in the abdomen. There was hypospadias. The scrotum was bifid and empty. The two sub-renal capsules and the two kidneys were united on the mesial line. The infant had been inscribed in the registers as a girl; but death taking place at eighteen months, the facts now specified were ascertained by Dr Breton.

The *vas deferens* has been observed more than once to terminate in, or rather arise from, a blind end, sometimes with corresponding deficiency in the epididymis; in other instances to terminate in a blind end below, without communication with the urethra; in other cases to be altogether wanting.

These deficiencies are explained, Mr Curling observes, by adverting to the mode in which the different parts are developed. From the researches of Muller and Valentin, it is known that the proper genital organs are in the two sexes developed in two distinct portions, viz. the part for the formation of the generative substance, the testicle or ovary, and the part for the conveyance of that substance out of the body, viz. the seminal duct or oviduct.

The testicle or ovary, between which, indeed, there is no distinction in the early periods of existence, is formed on the inner concave side of the *corpus Wolffianum*; and the seminal tube or oviduct, which is originally an isolated tube closed at both ends, passes along the outer border of the body, from the level of the formative organ above, to the cloaca or common outlet of the digestive, urinary, and genital systems below. The complete development is effected by the conducting tube establishing its connections at once with the formative organ, and through the medium of the cloaca with the exterior of the body. The sexual character is determined, when in the male the formative and conducting organs become connected by the development of those intermediate tubes which constitute the epididymis; or when in the female an aperture is formed at the upper or peritoneal extremity of the conducting tube, and is placed adjacent to the formative organ. In both sexes alike, the lower extremities of the conducting tubes first open into the common cloaca, and subsequently, when that cavity is divided by partitions into bladder and rectum, or bladder, vagina, and rectum, they acquire in each their proper connections, and become in the male the perfect *vasa deferentia*, and in the female the Fallopian tubes and uterus.

The application of these facts to the explanation of the malformation above noticed is not difficult. When the *vas deferens* exists, but without any epididymidal communication; in other words, begins by a shut sac; it shows that from some cause the communication had not been established between the isolated tube and the testicle. Conversely, when the *vas deferens* does not end in the urethra, it shows that from some similar cause the communication at the lower end or outlet had been prevented from being established. And in those cases in which the tube is wanting, or at least little developed, neither communications had been established, and the isolated tube there remaining unconnected with its anatomico-physiological relations had become atrophied and incapable of being recognized.

The author quotes some experiments by Sir Astley Cooper to prove what scarcely required any experimental demonstration, viz. that, while the testes are entire, though there may be a mechanical or physical impediment to the elimination of their secretion, yet the individual acquires and possesses all the distinctive marks of the male sex, so that the secreting organs alone are those upon which these sexual peculiarities depend. It is no objection to the truth of this inference, that engorgement of the seminal ducts, without the possibility of outlet, may cause inflammation and mortification, and thereby atrophy.

It occasionally happens that the testis either does not descend into the scrotum at all, or remains somewhere in the inguinal ca-

nal, sometimes in the abdomen, near the internal ring, sometimes in the groin, outside the external ring. The author refers to Mr Henry Marshall to show the numerical proportions which this gentleman found in 10,800 recruits to be five in whom the right testis, and six in whom the left was not apparent, and one only in whom both had not appeared. This delay or stoppage *in transitu*, as it may be termed, the author imputes to deficient action in the cremaster muscle, either from paralysis or from defective development of that muscle, or to partial adhesions of the testis to the peritoneum or adjoining part, a consequence of inflammation taking place in the foetus. The opinion of Mr John Hunter, that the *testes* in such circumstances were inadequate to their functions, he seems to conclude, rests on uncertain grounds.

An important difference, however, he takes occasion to point out between the energy of a testis retained entirely within the abdomen, and that of one which has been arrested in the inguinal canal. In all instances almost he states of the former accident, the testis has generally been found perfect in structure and adequate in function. But when found in the inguinal canal, it has happened that it has been more frequently found imperfect. This he ascribes to the pressure exerted on it by the abdominal muscles, to its being more exposed to blows and injuries, and to mere pressure or handling when mistaken for an inguinal hernia. In short, a testis situate within the abdomen is sheltered from much injury to which it is exposed in the groin. The following observations present the general results which Mr Curling deduces on this point.

“ The detention of the testis in the groin or abdomen must certainly be regarded as an unfortunate infirmity, and it particularly becomes so when the gland is attacked with disease. One great disadvantage of an imperfect descent which, especially to the detention of the testis in the abdomen, was overlooked by Mr Pott. It arises from the relation preserved within the peritoneal cavity, by which morbid actions originating in the testis are liable to extend to the parts in the abdomen, and I cannot but view the descent of this gland into the scrotum, and the isolation of its serous investment, as a wise provision, obviating the serious risks to which man would otherwise be liable, owing to the frequency of the diseases of this organ. It will be shown in subsequent chapters that secondary orchitis or inflammation, commencing in the epididymis, is peculiarly liable to extend to the *tunica vaginalis*, and that in all diseases of the organ this membrane is very commonly implicated. Now when the testis is situated in the abdomen or in the groin, and surrounded by a prolongation of peritoneum, there is no shut sac, no distinct *tunica vaginalis*, restricting the limits of inflammation when set up, but the disease is liable to affect the contiguous viscera, and to extend throughout the abdominal cavity.”—Pp. 84–85.

In proof of the correctness of these inferences, Mr Curling re-

lates two cases ; one of fatal peritonitis in a young boy of ten years, in which it appeared that the disease was induced by inflammation of the testicle, which was lodged in the groin ; the other in which similar symptoms, though less violent, came on in a man of 53, in whom the right testis was in the groin, and in whom these symptoms were only removed by active antiphlogistic measures.

The retention of the testis in the groin must be distinguished from bubonocoele, for which it is liable at first sight to be mistaken. The chief difficulty arises when the retained testis is complicated with hernia or hydroscrotocele.

In some rare cases the *testis*, instead of being found in the scrotum, is situate in the perinæum. The reason of this is not known ; but it must surely be owing to some elongation of the chord associated with malformation of the scrotum.

Atrophy of the testis is arranged by the author under two heads ; 1. Arrest of Development ; and 2. Wasting.

In the first case the *testes* are, though in a person of adult or ripe age as to years, small, and not larger than in a boy of 6 or 7 years of age. The individual also presents the appearance of a person void of sexual characters. There are no beard or whiskers, and no hair on the pubes. In one case recorded by the author one testis weighed only two scruples and one grain, the weight of the developed testis of average size being from four drachms to one ounce, or six drachms at an average. In the seminal fluid, also, there are no spermatozoa ; the physiological characteristic of that fluid.

In some instances atrophy, or non-development of the *testis* is associated with an undeveloped state of the brain, denoted by idiocy, with or without epileptic fits. Of this variety the author gives an example in the body of an idiot, aged 19, who died of typhus in the work-house of the Hackney Union. In this case both testes were in the scrotum ; but the right weighed less than one drachm, and the left not more than twenty-three grains.

But, in the second place, a testicle may, after being fully developed, and attaining the normal size in the adult, from various causes, begin to shrink in size, and gradually waste away, until it is very much reduced, and no longer capable of performing its proper functions. The reduction in size may vary in different cases, and proceed in different cases to different degrees. But whenever the testis of an adult weighs less than three drachms, Mr Curling thinks it must be regarded as in a state of atrophy.

A testis in an advanced state of wasting, not arising from disease of the gland, usually preserves its shape, but feels soft, having lost its elasticity and firmness. Its texture is pale, and presents few blood-vessels ; the *tubuli* and *septa* dividing the lobes are indistinct ; and the former cannot be so readily drawn

out into shreds as before. The epididymis does not usually waste so soon nor in the same degree as the body of the testis. It sometimes, however, loses its characteristic appearance, and Mr Curling has found it reduced to a few fibrous threads. The fluid expressed from the wasted testis and epididymis is entirely void of spermatic granules and spermatozoa. In many instances adipose tissue is deposited behind the *tunica vaginalis*, and encroaches on the epididymis and the vaginal tunic. Fatty matter has been found, indeed, in the glandular substance of atrophied testes, both by Mr Gulliver and by the present author.

Besides the changes now specified in the gland and epididymis corresponding changes take place in the appendages. The cremaster muscle disappears, the nerves shrink, and the vessels are diminished in size and number. The *vas deferens*, though small, can generally be injected with mercury, as far as the commencement of the epididymis. The shape of the gland even is changed; becoming uneven and irregular or even elongated. The surfaces of the vaginal tunic adhere; and the cavity is obliterated, partly or entirely. The glandular structure can no longer be recognized, and the organ is converted into firm hard fibrous tissue. It loses its peculiar sensibility to pressure, but is sometimes the seat of morbid sensibility.

The causes of atrophy may be distinguished into the following orders; all causes operating on the system generally and impairing its energy, as impeded circulation, pressure, want of exercise, loss of nervous influence; causes acting on the vessels of the testis, as aneurisms or other tumours compressing the spermatic arteries, the pressure of a truss injudiciously applied, hydrocele and other tumours; causes acting more or less directly on the organization and circulation of the testicle, as inflammation, metastatic inflammation after mumps; excessive secretion and concomitant over-excitement of the glands, as in cases of excessive indulgence in sexual intercourse, especially under the influence of stimulating and intoxicating liquours; and lastly, causes which act apparently on the generative and vocal systems, as in elephantiasis.

Of all these agents reputed as causes decidedly the most frequent are chronic inflammation, especially after blows on the gland or other injuries, the extreme excitement of the glands in sexual intercourse, as in the case of the soldiers of the Imperial Guard in Egypt, recorded by M. Baron Larrey, and probably various injuries of the nervous system, as in the case of injuries of the brain and cerebellum.

The wasting of the testis represented to take place after the use of iodine or its preparations, Mr Curling is disposed to regard as either totally groundless, or at least so unfrequent in occurrence as not to justify any general conclusions. The wasting which takes place in advanced age, he properly remarks, is never so great as

that which is observed to occur in young or middle-aged adults, and never proceeds to the same extent as in those cases in which the lesion has followed injuries of the brain.

Among injuries, especially those which are the result of accident, the most common are contusions of various degrees of severity. A kick on the parts,—a result not uncommon in some of those districts where the good old custom of fighting with the fists is kept up, is a cause not unfrequent; though the loud execration of the bystanders usually puts a stop to any advantages to be derived from so brutal a mode of assault. A blow on the pommel of the saddle, or a stroke from a cricket-ball, have equally been known to cause the accident. The immediate effects are often violent and alarming. Sudden faintness or complete syncope, sickness, vomiting, acute pain in the parts followed by cold sweats, are common, but transitory symptoms; the gland swells partly from extravasated blood, partly from inflammation. If these symptoms are speedily alleviated by rest, depletion, suspension of the organ, cold applications and low diet, the extravasated blood is absorbed, inflammation is abated, and the gland resumes its wonted size, sensations, and functions, without injury to its structure. But often the injury lays the foundation of different sorts of chronic diseases. Of these the most usual are chronic enlargement with induration, sarcocele, hydrocele, atrophy, and perhaps fibrous disease of the glands.

Self-castration has been often performed; sometimes by fanatics, sometimes by madmen, never by any person in his senses. Mr Curling mentions the pious Origen as an early model in the way of double castration; and the example is always quoted as an instance of the performance of this mutilation, in consequence of the literal interpretation of the words of our Saviour in the Gospel of St Matthew, xix. 12. It has ever appeared to us that this is a poor defence of the folly of the weak though holy Father. It seems never to have struck his friends that though he had thus disarmed the tempter, yet in the same degree he took away all merit in the practice of a holy and continent life. The merit of chastity was indeed by this expedient entirely abolished.

Mr Curling thinks that self-castration is very rarely attempted without some strong motive intimately connected with the sexual functions, arising from perverted use or guilty indulgence of them, and that some such cause may generally be ascertained on a little cautious inquiry; or that it is connected with the practice of the odious vice of masturbation. In illustration of this he gives the following case.

"A lad, aged 16, was brought to the London Hospital in June 1832, exhausted and faint with bleeding going on from two wounds

in the scrotum. They were each about one inch in length, and situate at the sides of the raphé. Upon examination it was found that the scrotum did not contain the testes. The boy subsequently gave the following account of his case. He stated that for about a week he had suffered from low spirits. Early in the morning he suddenly resolved to do himself some injury. His first determination was to cut his throat, but he afterwards resolved to perform the following act of mutilation. Having left his home in the Whitechapel-road for some fields in the neighbourhood, he first passed a piece of string tightly round the root of the scrotum; he then made an incision to the extent of one inch on one side with a common penknife, and having squeezed the testicle through it, divided the cord and removed the gland; he then proceeded to excise the other testicle in the same way. The loss of blood was considerable, and he endeavoured to restrain it by drawing the ligature tighter. He said he was not conscious of any pain in the operation; and though he could not assign any reason for selecting this mode of mutilation, he admitted that he had read in an encyclopædia an account of castration. The testes were found in the field where the act was committed. The cord was divided close to the testis on one side and at about one inch from it on the other. Ligatures were placed on the spermatic arteries; and in three weeks the wounds had completely healed. No symptoms of insanity were evinced whilst the boy remained in the Hospital; he enjoyed good health and spirits, and he talked and joked concerning his situation without appearing at all to feel his loss."—P. 116.

The very circumstance of making an act of this kind the subject of joke shows that the individual was not sane.

Other cases of the same description the author mentions, and among others the case of incomplete castration recorded by Mr Reid in the 48th volume of this Journal, (p. 93.)

Hydrocele is a disease so well known that it is almost unnecessary to speak of it. Mr Curling properly distinguishes it into two forms; one acute, the effect of inflammation, as long ago shown by Cruickshank; the other chronic, the effect either of chronic inflammation or of disease of the vaginal coat, or the *tunica albuginea*, or the testis itself, (see p. 134.) Again, however, hydrocele may take place in the vaginal tunic, or in the spermatic chord; or it may take place in conjunction with hernia. The various forms of hydrocele, distinguished either according to their origin, their seat, or their complications, Mr Curling arranges in the following tabular view.

Hydrocele of the	Testis,	{ Simple. Congenital. Encysted.	{ Of the epididymis. Of the <i>tunica albuginea</i> . Of the <i>tunica vaginalis</i> .
	Spermatic chord,	{ Diffused. Encysted.	
	Complications of	{ Simple h., combined with encysted h. of the testis.	
		{ Simple h., combined with encysted h. of the chord.	
		{ Simple h. combined with diffuse h. of the chord.	
		Oscleo-hydrocele.	{ Simple h., combined with inguinal hernia. Encysted h. of the chord, combined with inguinal hernia.
	Hernial sac,		{ True. Spurious.

On the anatomical and pathological history of each of these species of hydrocele, the author gives full and minute details; but as these are too lengthened for abstract, we shall not dwell on them.

The therapeutic methods also for the treatment, palliative and radical, are considered at great length, and their comparative merits appreciated with care and judgment. To the method by injection, especially that by injecting solution of iodine, he is on the whole disposed to give the preference. In this mode of operating, the great thing to be attended to in order to insure success is the after-treatment; and it seems surprising, that, in mentioning the mode pursued and sanctioned by Sir Astley Cooper, Mr Curling does not see ground for condemning it more strongly than he does. Notwithstanding the authority of that eminent surgeon, we must be allowed to doubt the propriety of a patient who "suffers but little" after the operation, "taking his dinner and two or three glasses of wine, or even taking exercise; still less do we think it right to say that "exercise and a generous diet are to be recommended indiscriminately until redness of the scrotum, swelling and pains in the part be produced." From this Mr Curling, it must be allowed, does dissent a little; but he speaks less decidedly than in our opinion a good surgeon ought to do in order to insure the favourable result of the operation. Though the characteristic adhesive inflammation may be slow in commencing, and may even in some rare cases be inadequately mild, yet there are other cases and these infinitely more numerous, in which they are violent, intense, and the cause of much suffering; and the only way in which the surgeon can keep them under control, and render the artificially induced disease completely and suitably subservient to his purpose, is by avoiding and even prohibiting that species of dietetic and corporeal management, which is well known to aggravate local inflammation, and to render the process violent and some-

times destructive. It seems so much the more extraordinary to recommend exercise after such an operation, when Sir Astley Cooper himself allows that he met with two cases in which, after the simple puncture of the vaginal tunic, without injection, a long walk was succeeded by inflammation and sloughing of the scrotum, which terminated fatally, (p. 150); and Mr Curling tells us that, some years ago, after tapping the hydrocele of a healthy man of 50, a walk of several miles was followed by inflammation of the sac and sloughing of the scrotum, from which the patient narrowly recovered only at the end of eight weeks, (p. 150.)

In short, as it is quite impossible to say beforehand whether in any given patient, the operation is to be followed by violent or by moderate inflammation, by inflammation of the adhesive or the suppurative and sloughing character, the course which every prudent surgeon will observe, is to enjoin rest and low diet at first, until he is satisfied that all chance of violent and destructive inflammation is past.

For the accident of sloughing of the scrotal cellular tissue in consequence of the escape of the injected fluid into it, Mr Curling recommends the usual practice in cases of extravasation of urine; viz. incisions in the depending region of the scrotum, and the use of fomentations and poultices; where gangrene with symptoms of debility ensues, the use of wine, brandy, and bark or ammonia. Another accident in certain rare cases observed to ensue is tetanus.

It is quite right to mention that the author, in his concluding summary, when he decides in favour of the method by injection, enjoins strongly the propriety of keeping the amount of inflammation at the lowest possible rate.

Encysted hydrocele of the testis is a disorder not so well adapted to the cure by injection, or indeed by any mode as simple hydrocele. When, indeed, the tumour is small in size, and not the seat of pain, or the source of inconvenience, the author recommends that it should be left untouched. When painful or troublesome from its size, he recommends that it should be punctured either at the posterior or lateral side of the tumour, to avoid injuring the *testis*, and its contents evacuated. As, however, the fluid is again collected, and as injection does not answer well for the cure of this variety of hydrocele, he recommends that the method by seton be adopted, and this, he states, he has found both safe and effectual.

The author is quite right in regarding the cases published by Mr Laing of Aberdeen as examples not of cystic or hydatoid disease of the testis, but as mere serous cysts outside the testis, most likely connected with the epididymis.

For the radical cure of encysted hydrocele of the spermatic

chord, Mr Curling in like manner recommends the method by seton.

After a good account of hæmatocele, follows a full and particular account of *Orchitis*, or inflammation of the *Testis* in all its forms and varieties. This is the disease called by the very absurd name of *Hernia humoralis*,—a term which it would be well to banish entirely from surgical nosology and nomenclature. Though seen as a primary disease, the effect of blows, injuries, and contusions, yet it is much more as a consecutive or secondary disorder. Thus it is the effect of gonorrhœa, of mumps, of irritation in the urethra, and of rheumatism. Secondary orchitis, gonorrhœa, is most usually observed to affect the right testicle. Thus in 73 cases of orchitis observed by M. Gaussail; in 45, the disease was on the right side; in 24, on the left; in 4, on both sides. Among 29 cases of gonorrhœal orchitis, M. D'Espine found 12 on the right side, 11 on the left, and 6 on both sides. Among 86 cases registered by Mr Curling, 21 occurred on the right side, 14 on the left; and in one only were both testes affected. The whole three series of observations combined give the following result. Of 138 cases of *orchitis*, in 78 the right testis was affected, in 49 the left, and in 11 both glands.

Regarding the rheumatic, which is supposed by Dr Macleod to affect the albuginea chiefly, Mr Curling has not been able to arrive at any very decided inferences. To us it appears that in all the cases regarded as rheumatic, the disease originated in an attack of gonorrhœa, and the rheumatic symptoms were connected rather with the urethral irritation and inflammation than with the affection of the testicle.

In conducting the treatment of this disease, Mr Curling most properly enjoins not only the horizontal position, but the greatest possible elevation of the parts, in order to counteract the effect of gravitation. The nauseating effects of tartar emetic are also very properly recommended. The employment of mercury appears to us rather more questionable, for several reasons; 1st, If the proper remedies are promptly and energetically used, mercurialism is quite necessary. By proper remedies, we mean blood-letting, general and local, rest, and elevation of the parts, the use of gentle laxatives, low diet, and the depressant effects of tartar emetic. 2d, If these be inadequate to diminish pain, reduce the swelling, and promote resolution, it rarely happens that mercury in any form is more adequate. We know, that, under or during its use, the swelling has been thought to subside, and the pain has been said to disappear; but it has always appeared to us doubtful, how far these effects were the continuing or proceeding consequences of the previous treatment, and whether they would not have taken place, though no mercurial medicine had been administered. 3d, Mercury given for the removal of this disease is quite

as likely to do evil as to do good. It often lays the foundation of obstinate periosteal inflammation, of cutaneous eruptions, and other chronic maladies. If, however, after these facts and arguments, any one think that it is a remedy justifying the confidence which several practitioners repose in it, then assuredly it is perfectly right that the individual so thinking may give it a trial. If it ever be useful it is not in affections of the testicle, but solely in that of the vaginal tunic, in which, as in other affections of serous membranes, it does seem occasionally to be followed by antiphlogistic effects.

Mr Curling is very favourable to the employment of compression by means of slips of adhesive plaster in certain forms of acute inflammation of the testicle. It appears to us that this is not properly denominated compression, but that it ought rather to be called mechanical support. Another fallacy which we think is in danger of being propagated regarding this mode of treatment relates to the time, or stage, or kind of inflammation to which it is applicable. On this point we are satisfied that it is not in acute inflammation, but in the passive or chronic state that compressive support is most beneficial. It is, in short, only after all the acute symptoms have been subdued by active measures that this can be beneficial.

It must, however, be allowed, that the author has collected a strong body of evidence in favour of this method which deserves the trial of the surgeon. Mr Curling practises it in the following manner.

“The patient being placed in the recumbent position, with the testis raised, is to remain there three or four minutes, in order to allow the vessels of the gland to become as empty as possible. The parts are to be shaved; and some *emplastrum plumbi* must be cut into strips, about three-quarters of an inch in width, and eight or nine inches in length. The opposite testis and side of the scrotum being drawn away from the diseased one, so as to render the integuments of the latter quite tense, the first strap is to be placed circularly round the cord, just above the testis, as tightly as the patient can bear it. The second strap is to be placed in an opposite direction, from behind forwards, at the side of the testis near the septum. The third strap is to be applied below the first, so as partly to overlap it; and the fourth in like manner, internal to the second; and so on in succession, until the straps meet, and the whole of the testis is covered, and evenly compressed. A few additional straps may afterwards be applied where most needed to afford support, and keep the others in place; the parts are afterwards to be supported in a suspensory bandage. The strapping generally requires to be reapplied in the course of twenty-four hours. When the patient rises after its application, he feels completely relieved from the aching pain and sense of weight; and patients who have remained in

bed in consequence of the pain, have immediately been able to get up and walk about."—Pp. 283, 284.

The conditions which we have already specified require, nevertheless, to be observed.

"Some surgeons recommend the application of compression at the onset of the inflammatory attack ; and if the inflammation be moderate, this may be done with advantage, so that when concealment is desirable, the patient may be able to continue his usual avocations. But in decidedly acute orchitis, it is better to commence with an active purge, the tartar emetic, and, if necessary, depletion, and to enjoin rest ; and then, after twenty-four or forty-eight hours, to resort to compression ; for in active inflammation of the testis, compression is not always sufficient without other antiphlogistic means, and if solely depended on, may disappoint expectations. But after the more acute symptoms are relieved, compression greatly facilitates the cure, affording relief from pain, causing the rapid subsidence of swelling, and removal of all effused matter. In cases of a chronic character, or to remove the thickening and induration of the epididymis and cord so commonly observed after acute consecutive orchitis, the testis may be strapped with the *emplastrum ammoniaci cum hydrargyro* ; or iodine or mercurial ointment may be first applied to the scrotum, and then the strapping, so as to combine the advantages of these applications and of compression."—Pp. 284, 285.

At the close of this chapter, Mr Curling mentions the hypothesis of Mr Ramsden, chiefly to express his dissent from it ; and he adds that Mr Ramsden was particularly in error in applying his remedies to the urethra rather than to the testis itself. Allowing this, however, Mr Curling admits that the observations of Mr Ramsden were useful in directing the attention of surgeons to the urethra as not unfrequently the seat of some chronic inflammation, in cases of indolent enlargement of the testis.

Chronic enlargement next comes under consideration. The chief anatomical character of this disease, the author represents to be the deposit of a peculiar yellow homogeneous inorganic matter in the structure of the testis. This substance, he adds, when first formed, is soft in consistence, but afterwards becomes firm and solid, and so closely adherent and intimately blended with the proper structure of the organ, as not to admit of separation without much difficulty. In some instances this matter is deposited in one single mass ; in others in several ; and sometimes it is infiltrated. It may also be deposited in the epididymis.

It is not yet ascertained in what particular tissue this matter is deposited. Sir Benjamin Brodie is of opinion that it is secreted from the inner surface of the tubuli ; and this inference Mr Curling appears to have demonstrated by means of injection and microscopic observation, (p. 293.)

The matter deposited appears to be coagulable lymph, which becomes more solid in the testis than in any other part, (295.) It is described and delineated by Cruveilhier, (Liv. v. p. 1., and Liv. ix. pl. 1.,) and is doubtless the most common form of the disease described under the general name of sarcocele.

It is important to ascertain in a therapeutical point of view whether this matter, after being effused within the seminiferous tubules, can be absorbed. According to the present author it may be absorbed completely. He allows, however, that, in several instances, ulceration takes place in the tunics and integuments, and through the opening thus made a fungous-looking substance gradually protrudes, which, he thinks, is formed in a manner very analogous to that of *hernia cerebri*. "It appears," he says, "that the yellow deposit after some time excites ulceration in some part of the *tunica albuginea*. The vaginal coat, and afterwards the skin become adherent at this spot, and then inflame and ulcerate. The resistance afforded by the dense unyielding *tunica albuginea* being thus removed, the adventitious deposit gradually presses out the tubular structure, which forms a projecting tumour constituted of the *tubuli testis*, mixed with this yellow substance, and also of ordinary granulations, which spring up from the seminiferous structure." (P. 297.)

The true nature of these cases was explained, indeed, many years ago, in the fourth volume of this Journal, p. 257, by Mr Lawrence; and by all who have since observed the disease, the accuracy of the observations of Mr Lawrence has been confirmed. Though the hernial protrusion occurs most frequently in an advanced stage of the chronic form of inflammation, it takes place in other diseases of the gland which occasion ulceration of the *tunica albuginea*, and thus afford an opening for the escape of its contents. It is occasionally the result of an attack of acute inflammation supervening upon the chronic disease, and terminating in suppuration of the substance of the gland. In this class of cases, besides the glandular swelling, there are sinuses more or less numerous, burrowing in the interior of the organ, and discharging purulent matter mingled with yellow matter. An attack of orchitis, originally acute, proceeding to suppuration, is also liable to terminate in fungous protrusion of the secreting structure of the gland. In the latter case this growth is less exuberant; and the seminiferous structure more apparent, owing to the absence of yellow matter.

Testes, when affected by this disease for a long time, and remaining stationary and indolent, with hardness and irregularity for years, are often then regarded as scirrhus; but the denomination is not properly applicable; and, indeed, the disease is different from scirrhus, both in anatomical characters, the sort of subjects whom it attacks, and in its modes of termination.

"It will be perceived from the preceding observations," says Mr Curling, "that the tendency of this chronic disease is gradually to destroy the integrity of the testis. If the inflammation be checked in an early stage, the gland is left unimpaired; if its course be not arrested until a later period, the secreting structure is partly disorganized and reduced in size; but if the disease be allowed to continue unchecked by treatment, the organ is totally destroyed, either by ulceration of its tunics and the escape of the glandular structure in the shape of a fungous growth, or by the slower process of wasting and absorption."—P. 299.

It may not be unseasonable here to add, that this disease is liable to terminate in sloughing; that is, the fungous masses which protrude from the *testis* through the *tunica albuginea* seem to become strangulated and die; and masses of them are in this manner detached dead from the gland. We know not whether this is to be regarded as indicating any peculiar variety or form of the disorder. The few cases in which we have seen it take place were observed chiefly in young men of very distinctly strumous habit.

The causes of this form of chronic *orchitis* are various. Sometimes it arises shortly after the cessation of an attack of acute *orchitis*, especially when the patient has been "guilty of some imprudence," says Mr Curling,—a mode of expression which seems to find some explanation in the very next line, when he adds, "after excess in venery," &c. It follows stricture, takes place during an attack of gout or rheumatism, and is most common in constitutions impaired by the use of mercury, intemperance of various kinds, and in those, in short, in whom the vital powers and energies are enfeebled, as in persons liable to cellular inflammation and carbuncle. In short, it seems to be one of the multiplied modes by which excess and the intemperate indulgence of the passions is made to punish itself.

This disease must be distinguished from encephaloma and scirrhus of the testis, and hematocele.

Formidable as this disease appears, in general, if care be taken, and the powers of the system maintained by judicious management, recovery may be effected. The fungating masses are recommended by Mr Lawrence and Sir Astley Cooper to be removed by the knife. To this, however, Mr Curling is opposed, and recommends as little surgical interference as possible, with the following method which he pursues, he states, with advantage.

"The patient is directed to keep in bed, and if there is any tenderness or pain in the testis, to take four or five grains of blue pill night and morning, until all symptoms of existing inflammatory action are removed. A piece of lint of sufficient size to cover the sore having been dipped in a strong solution of the nitrate of silver, in the proportion of five grains to the drachm, is placed on the part. One or two compresses of lint are applied over this, and tolerably firm

compression is then made by several strips of adhesive plaster ; and the whole is secured by a bandage. This is to be repeated daily ; and as the protrusion recedes, the scrotum is drawn over it, and the edges of the wound are gradually approximated by narrow strips of plaster. Under this treatment cicatrization takes place, and the testis gradually resumes its place in the scrotum, but remains firmly adherent to the new skin. In cases where there is no occasion for the exhibition of mercury, or after its discontinuance, if the general health be impaired, the sulphate of quinine, iodine, steel medicines, or bark and soda may be combined with the local remedies." — P. 319.

Sir Benjamin Brodie applies the nitric oxide of mercury to the fungous masses, and after they are covered with healthy granulations, a weak solution of sulphate of copper in camphor mixture.

Next comes syphilitic *orchitis*, a variety merely of the secondary form of the disease. So far as is known, the changes are the same as in chronic *orchitis*, only proceeding from a different remote cause. The great remedy is said to be mercury. Yet the author, not very consistently, allows that the disease may be cured without the use of the mineral,—by means of local depletion counter-irritation and rest, combined with decoction of sarsaparilla and iodide of potassium.

Tubercular disease of the testis, which comes next, occurs chiefly in strumous habits, and consists in effusion or infiltration of tubercular, tyromatous, or cretaceous matter, either into the tubules of the epididymis, or those of the testis, or in separate cysts.

It is an unmanageable complaint, renders the gland hard, large, and irregular on the surface, and finally causes ulcerative destruction of the gland.

In treatment, the author allows chalybeates and decoction of bark with sesqui-carbonate of soda or infusion of gentian or sarza, with *aqua potassæ* to be useful ; but the great and effectual remedy he pronounces to be iodide of potassium.

Carcinoma of the testis is next considered under the four varieties of scirrhus, encephaloma, colloid disease, and melanosis.

In the sixteenth chapter on the nervous affections of the testis, the reader is presented with much instructive information on irritable testis and neuralgia of the testis. The treatment must be modified according to the causes, which are very various. Though neuralgia is often traceable to the dilated state of the spermatic veins, yet it is often unconnected with this complaint ; and in a much larger number of cases it is associated with, if not dependent on a disordered state of the alimentary canal, especially in the gouty. The author allows the obscurity in which the causes of neuralgic pains in the testis are involved.

In the seventeenth chapter, on the sympathetic and functional disorders of the *testis*, the author traverses an extensive field,

and examines skilfully the various causes which may derange, impair, or destroy the functions of these glands.

In Part third, devoted to the Diseases of the Spermatie Chord, Mr Curling gives an account of varicocele, adipose tumours of the spermatie chord, and spasm of the cremaster muscle.

In the fourth part, on the Diseases of the Scrotum, are given good accounts of Elephantiasis of the Scrotum and the Chimney Sweeper's Cancer.

Into the consideration of these subjects, our limits will not allow us to enter; and we mention them chiefly in order to inform our readers what they may expect to find.

Mr Curling, it will be seen, has been at great pains to collect correct and useful information on the Diseases of the Testis from all the best sources; and his work must be allowed to be the fullest and most correct systematic treatise on the subject extant. He has devoted much attention to the elucidation of the morbid anatomy of the different diseases; and his therapeutic principles are in general rational and judicious.

Lastly, it is proper to say, that the illustrations with which this volume is accompanied cannot fail to be extremely useful to the student of surgery and surgical pathology. The figures are accurate, distinct, and beautifully executed, and, while they reflect credit on the artist, enhance very much the value of the labours of the author.

ART. III.—*Recherches sur le Developpement des Os et des Dents*. Par P. FLOURENS, Secrétaire Perpetuel de l'Académie Royale des Sciences, Professeur de Physiologie Comparée au Museum D'Histoire Naturelle, &c. 4to. Paris, 1843. With 12 coloured Engravings. *Researches on the Development of the Bones and Teeth*. By P. FLOURENS, Perpetual Secretary of the Academy of Sciences, Professor of Comparative Physiology to the Museum of Natural History, &c.

M. Flourens read the substance of the above named work in a series of seven papers before the Royal Academy of Sciences of Paris, the first communication being read on the third of February 1840, and the last during November of last year. Impressed with the importance of studying the minute changes within the living body, and finding that this, to a very considerable extent, was within the power of the experimental physiologist to do, by observing the changes which take place in the solid frame-work of the body when operated on in various ways, he engaged in a very

long and carefully conducted course of experiments, the results of which are now given to the public.

The singular action of madder on the bones seems to have been noticed so early as 1572 by Antoine Mizam, a physician at Paris. No practical conclusions, however, appear to have resulted from this discovery, and, indeed, it appears to have been forgotten till John Belchier,* a London surgeon, and Duhamel,† the celebrated vegetable physiologist, drew the attention of the public to the subject, and showed the practical results which might be drawn from taking advantage of this singular property of the dye. Haller, Hunter, and many others repeated these experiments, and many curious facts relative to the mode of growth of bones were ascertained, which have in all late writings on these substances been but too much overlooked. All these experimentalists recognized the important fact, that, when madder was given to an animal along with its food, it reddened the bones, but the bones alone, leaving all the soft tissues of the body of their usual colour. But if any ossific deposit existed in any of the other tissues, that ossific deposit was also reddened; in fact, no particle of bony matter escaped the reddening action of the dye.

Duhamel, with singular acuteness, succeeded by this means in unravelling much of the mystery which hung over the mode of growth of bone. He found that if the animal were fed on madder and then killed, its bones were reddened; but that, if it was allowed to live on its ordinary food for some time after the madder diet was given up, the bones returned to their natural colour; and this, not in consequence of the madder being re-absorbed from them, but in consequence of the reddened bone being covered or enveloped with a fresh coating of new and white bone. By alternately feeding an animal on ordinary diet, and on madder diet, he procured bones coloured alternately white and red—the one layer enveloping the other. Duhamel's celebrated experiments on the growth of woods are known to every one; his experiments on the bones led him to conclude that they, like the concentric layers of wood, grew by the addition of enveloping layers. According to the views which different physiologists have held, so have they rejected or approved of these experiments of Duhamel's, and it was to set the matter at rest, by a careful and long continued series of experiments, in which every fallacy might, as far as possible, be avoided, that M. Flourens was induced to repeat Duhamel's experiments, and judge for himself.

Flourens found that the madder of Alsace reddened the bones much more intensely, and in a shorter time, than that of Avignon. In all his experiments it was the bones alone which were reddened. One seeming exception alone occurred, viz.

* Phil. Trans. Vol. xxxix. September, 1736.

† Memoires de l'Academie des Sciences, 1739, 1742.

a reddening of the eyes in birds—a circumstance also previously noticed by Duhamel. On examination this was found to depend on the circle of bones which forms the anterior part of the sclerotic coat being reddened like the other osseous parts of the body; so that it was bones alone which had taken on the red colour. Numerous experiments were made to ascertain how long the dye required to be in the system before it affected the bones. On this point the facts are extremely curious. In very young animals (pigeons were chiefly experimented on) the bones were found to be reddened in so short a space as even five hours after the food with the madder was given,—a very few days at furthest sufficed to produce the deepest rose red tint in all the bones. With the adult animals (old pigeons) it was very different. The action of the madder was not only feeble, but after 18, and even 22 days' use of the madder, their bones were not perceptibly tinted with the colouring matter, and even after its use for many months, their bones had scarcely acquired a faint rose tint.

Prosecuting his researches, M. Flourens observed the same fact as Duhamel did before him, that, by alternately feeding an animal on madder and on common food, its bones, when sawed up, exhibited alternate concentric layers of coloured and uncoloured bone. But Flourens was not satisfied with this experiment. It undoubtedly proved to demonstration that the bones grew in thickness by the addition of enveloping layers from their outer surface, but he wished still further to know what became of the internal layers, whether they were absorbed or opened out to make room for the increased dimensions of the medullary canal.

Pigs were therefore selected as the subject of experiment. After feeding one with madder for a few days, it was killed, and the whole bones of its body were found of a deep-red colour externally. On sawing open some of the long bones, it was observed that the red external layer was very thin, and that the chief thickness of the bone consisted of white bone. Other pigs were, therefore, fed on madder for a month, so as to produce a good thickness of red-coloured bone, and were then kept on their ordinary food for six months. It was then found that the red circle produced by the madder was in the interior of the bone, next the medullary canal, and that either no white circle of bone was within this, or small patches here and there only remained. The great thickness of the bone was caused by the outer covering of white bone. The experiments were variously modified, as by feeding the animals with madder at more frequent intervals; and the same conclusions were invariably arrived at, viz. that, in proportion as new layers of bone were added on the external surface of the bone, the older layers were removed by a process of absorption, so as to enlarge the medullary canal. This absorption, however, was proved only

to take place where the layer of bone came in contact with the medullary membrane. The successive and concentric circles of bones retaining their thickness unimpaired till, by the absorption of the internal layers, they also came in contact with the medullary membrane.

Flourens thus proved that the process of enlargement in thickness takes place in consequence of two distinct processes going on at one and the same time, viz. the addition of new layers to its periosteal surface, and the absorption of layers from its medullary surface. The more the bone takes on increased thickness, the more capacious becomes its medullary canal.

This fact, which the experiments of Flourens so satisfactorily prove, viz. the absorption of the internal layers of bone, and consequent enlargement of the medullary canal, was one of those things which confused Duhamel, yet to which his own experiments might have led. But as he had previously adopted the theory, that the medullary canal increased in consequence of the bony plates themselves swelling out or enlarging, his eyes were blinded even to his own experiments. He surrounded the bone of a young pigeon with a silver wire, immediately below the periosteum, and after a time found it entirely covered by bony layers and lying free in the medullary canal. The bone which it had encircled was now absorbed, and new layers of bone had formed over it. He unfortunately did not see his own experiment in this light, and thus lost the merit of pointing out the true cause of this phenomenon.

Thus far it might be said that Flourens had merely confirmed and extended the results of the previous experiments of Duhamel and Hunter. But to Flourens is due the whole merit of proving by means of the action of madder on the bones, how they grow in length. When an animal was fed with madder for a month, and then with ordinary food for four months, on the long bones being sawed up and examined, it was observed that at their extremities, both upper and under, there was a layer of red-coloured spongy bone internally or next the medullary canal, whilst the extremity of the bone itself was white. Bones, therefore, increase in length by growing from their centre towards their extremities, not by concentric layers, but by layers placed in juxta-position. This fact was rendered apparent by many experiments. If the animal were fed with madder, then with common food, and again, before being killed, with madder, three distinct layers were seen at each extremity of each bone. The first or internal was red, corresponding to the first feeding with madder; the second or middle layer white, corresponding to the feeding with its ordinary food; and the external or terminal layer red, corresponding to the feeding with madder before killing it.

It seems astonishing that Duhamel and Hunter did not arrive at this conclusion, as their own experiments demonstrate beyond the possibility of dispute, that the bone does not grow in length by an extension of its already formed parts. Both Duhamel and Hunter pierced holes in the long bones of animals, ascertained their exact distance from one another, and after some weeks or months killed the animals, and on measuring the distance between the drilled holes, found them of the same exact distance as they were when first pierced, although the bones had greatly increased in length.

"From these experiments it results," says Flourens, "that the mechanism of the development of bone consists beyond doubt of a continual mutation of all the parts which compose it. This bone, on which we now look, and which is in a state of development, has not, at this moment, any of the particles which it had a little while ago, and very soon it will have none of those which it has to-day. In all this perpetual change of matter, its form alters very little." This is one of the first and fundamental laws which regulate organization. In every thing that has life, the form is more persistent than the matter. Buffon and Cuvier arrived at this conclusion from abstract reasonings, and in their writings strongly pointed out this circumstance, but it may now be admitted as a fact, proved so beautifully, as it appears to be, by the experiments of Flourens on bones.

Flourens having thus proved that the external and internal surface of the bone is undergoing opposite actions; that the one is receiving new additional layers, whilst the old layers are in a process of continual absorption on the medullary or internal surface, next endeavoured to ascertain by what particular process it was that these additions and removals were effected. It may be remembered that the illustrious Duhamel proved by his experiments that the periosteum itself was converted into bone; that, in fact, bone consisted of the periosteum ossified in successive layers. He went further; he endeavoured to show that the callus around broken bones was nothing else than infiltrated layers of periosteum, which filled the spaces between the broken bones, and by undergoing the process of ossification, united them together. These views of Duhamel, founded on experiment and careful dissection, have been again and again disputed, and this, too, by inquirers who have repeated his experiments. Flourens, therefore, carefully repeated all Duhamel's experiments, and states, that, after having done so, he must confess many of his doubts as to the correctness of the conclusions drawn still remained. He, therefore, found it requisite to vary and enlarge many of these experiments, and such has been their success, that in his opinion they allow one conclusion only to be drawn.

When a bone is broken, the periosteum and blood-vessels are ruptured at the same time, and the neighbouring parts are generally more or less injured. Effusion of lymph and of blood consequently result, and is followed by the consolidation of this lymph and this blood. All this goes to the formation of what has been termed the "provisional callus." The "true callus," however, is a very different object; it is a portion of the new bone—a bone which results from the ossification of a portion of the periosteum. These facts were proved by Flourens, by imitating the experiments of Troja and Macdonald. A hole was drilled in a long bone in a living animal, a stylet or wire introduced, and the whole of the medullary membrane destroyed. This operation destroyed the vitality of the bone without injuring the periosteum or vessels on the outer surface of the bone. The bone consequently became necrosed, and an entirely new bone formed outside the old one, enclosing the old bone in its medullary cavity. The new bone, however, had a proper periosteum covering it externally, and a proper medullary membrane lining it internally; and was in every respect, as to form and adhesions, the very same as the old bone which had been destroyed. What was not a little curious was, that, when the old bone was thus encased within the new bone, it was acted on by the medullary membrane of that bone, and in part at least absorbed, as evidenced by its diminished size and corroded, worm-eaten aspect.

From a long series of experiments, and a careful examination of the preparations thus afforded, Flourens drew the following conclusions.

1. That the destruction of the medullary membrane of a bone is followed, firstly, by the death of the bone, and afterwards by the formation of a new medullary membrane, and a new bone.

2. That the new bone is formed between the new medullary membrane and the periosteum.

3. That this new medullary membrane and this periosteum form at first but a single, very thick membrane, divisible into many layers.

4. That the new medullary membrane, at first united to the periosteum, separates little by little, in consequence of the interposition of a new bone between them, which, as shall be immediately shown, forms between these two membranes.

5. That the tissue of the new medullary membrane, at first very thick and very dense, and quite similar to the fibrous tissue of the periosteum, which is at that time also very thick, gradually assumes a more delicate and finer texture, becomes hollowed out into cavities, exhibits projecting portions, becomes filled with juices; and, in fine, becomes a medullary membrane as fine, as regular, and as perfect as the primitive one.

6. That the internal surface of the new medullary membrane, by turns hollowed out and mammillated, dissolves, and eats away by degrees the old bone, and ends by absorbing it completely.

This last fact is stated to be proved by the fact of the actual disappearance of the bone, and also by the fact that the mammillated projections correspond to the hollows or worm-eaten holes on the old bone, while the hollows on the membrane correspond accurately to the projecting parts of the old bone.

By examining bones which had been operated on by destroying the medullary membrane, at all periods, Flourens found that the periosteum, which was uninjured, soon began to thicken; that that portion of it next the bone assumed a cartilaginous appearance, or formed a layer of cartilage encircling the old bone; and that this cartilage was the germ of the new bone which was to succeed the old one. At this period the connection of the periosteum with that layer of it which afterwards became converted into the medullary membrane, was very apparent. On tracing the periosteum to the extremity of the bone it was found to consist of one dense layer,—a little further up this layer separated into two,—one running close to the old bone, and forming the medullary membrane of the new forming bone; the other, forming the periosteum of the new forming bone, while some of its converted or altered intermediate layers formed the new bone itself.

Relative to the much disputed point, whether the union of broken bones is caused by the ossification of an effused gelatinous or plastic fluid, or in consequence of the ossification of the thickened periosteum, M. Flourens's whole experiments prove that it results from the conversion of the thickened and infiltrated periosteum into first cartilage, and then bone. By feeding animals with madder, after their bones were broken, and killing them at different times, this fact was established. The periosteum was traced from the one broken end of the bone to the other, all the free portion having assumed a cartilaginous consistence, dipping in between the broken ends of the bones, and gradually becoming ossified. It was found impossible to separate the periosteum from this cartilaginous mass either on the outside or inside next the broken extremities of the bone, but the whole thickened cartilaginous mass evidently resulted from the changed periosteum. These facts were still more satisfactorily ascertained when the process of ossification commenced, for then the newly deposited bony matter was found within the layers of periosteum which still connected the ends of the broken bones.

Flourens, therefore, has no hesitation in stating, that "the theory of Duhamel, a theory which sees nothing in ossification but the transformation of periosteum into bone, appears to be fully proved by all my experiments."

Flourens, however, not only shows that the office of the internal periosteum is to absorb the layers of useless bone, or remove the old bone when it becomes necrosed; he also shows that it may assume the functions of a formative organ, and generate a new bone. This developing agency of the medullary membrane, or internal periosteum, only takes place when the old bone has been destroyed in consequence of the destruction of the external periosteum, when the medullary membrane forms a new bone within the old one. When the periosteum was destroyed over only half the extent of the bone, the new bone formed within the old extended only that length, was seemingly intended merely to replace the old piece which was killed by being deprived of its periosteum. When the whole of the periosteum was destroyed, the medullary cavity became obliterated from the medullary membrane forming a new bone throughout its whole extent.

By surrounding the long bones of various animals with wires of platina or of silver, Flourens rendered more apparent the successive formation of enveloping layers of bone. When the bone and periosteum were surrounded with a wire, after a certain time the wire was found surrounding bone alone, but covered with a new periosteum. If the animal were allowed to live a little while longer, the ring was found itself enveloped or included in a bony layer, and a new periosteum over all. This showed the increase of the diameter of the bone by superimposed and external layers. To prove still more satisfactorily that the ring of wire could not have been covered by a rupture or extension of the existing bony fibres, Flourens amputated one limb of the animal at the same time that he surrounded the bone of the other with a metal wire. After allowing the animal to live a certain time, and feeding it on madder all that time, he killed it, and on examining its bones, found that the part of the bone still surrounded with the ring was white, and of the same diameter as the corresponding bone of the limb which had been amputated, whilst that the bone which had been formed over the ring and enveloped it was reddened, and rendered the bone of increased diameter. The experiment was varied in many ways, but always with the same result.

Duhamel's and Hunter's experiments on boring holes in the bones at fixed distances were repeated in various forms, and with the same invariable result, viz. that the holes did not increase their distance between each other in the shaft of the bone, but that the elongation of the bone took place by its extremities only.

From numerous experiments, also with wire, it was ascertained that the periosteum itself was reproduced by external and superimposed layers, just as the bone itself was formed. When the periosteum was itself included in the ring of wire, that layer being converted into bone, a new layer was produced external to the wire, enveloping it likewise.

Such, then, is a brief account of Mr Flourens's satisfactory and conclusive experiments and observations on the structure and mode of formation of bone, and on the mode by which it is repaired.

The teeth next engaged M. Flourens's attention. Belchier, in his original treatise on the coloration of bones by madder, remarked that the teeth also were coloured by that substance, but that the enamel did not take on the colour, being of a different nature from bone. Duhamel, in his original memoirs, said nothing about them; but his nephew Fougereux, who defended his theories from the attacks of Haller, Dethleef, and Bordenave, supplied this omission. He described the roots of the teeth as true bones, which, like bones, were coloured with madder; but that these bones were formed of layers which covered one another in such a manner that they might be compared to a series of cones or goblets placed one within the other. Hunter and Blake also remarked the fact of the coloration of the osseous part of the teeth by means of madder, but did not arrive at any very satisfactory conclusion as to their mode of growth from their experiments.

Flourens, after feeding pigs with madder for some time, turned them to their ordinary food, and when they were killed and their teeth were sawn up and examined, a red-coloured layer was seen next the enamel, and a white layer next the internal cavity. If the pig was again fed with madder before being killed, the outer layer was red, corresponding with the first feeding with madder, the middle layer was white, corresponding to its ordinary nourishment, and the internal newly formed layer was red, corresponding to the last given madder. When an animal, after being fed with madder, and having its teeth thus coloured, was allowed to live some months, it was found that the older layers became much diminished in thickness, and, from being internal, became external. This fact was repeatedly ascertained. It was ascertained that the layer next the enamel became absorbed, so at least Flourens argued, because, on comparison of the relative thickness of the layers after a long period with what they are at first, it was found that that next the enamel had in some cases almost altogether disappeared, in others was reduced to a very great degree of thinness. The enamel itself was never coloured.

From his experiments, then, M. Flourens draws the following conclusions:—

1. That teeth increase, like bone (in length), by distinct juxtaposed layers.
2. That in the development of the teeth, as in that of the bones, there is always addition of layers by one surface, and absorption of the layers by another.
3. That this addition and this absorption take place in the teeth in the inverse direction to that of the bones. The addition

which is external in the bones being internal in the teeth ; and the absorption which is internal in the bones being external in the teeth.

4. That the only part of the tooth which is coloured by madder is the osseous part ; the enamel does not colour.

It will be seen from these experiments that Flourens confirms the observations of Fougereux and Cuvier, who also held that teeth were composed of conical portions embosed within one another. The absorption of the layers of ivory when they arrive at the enamel, M. Flourens seems scarcely to have proved,—at least all he has stated has left a doubt on our minds which we would wish to see removed. The wearing down of the tooth, the circumstance of there existing no unossified membrane between the enamel and ivory, the fact of many teeth of fishes being merely pointed with enamel, and the whole of the exposed ivory being beyond the agency of vital action, the circumstance of the ivory, enamel, and *crusta petrosa* being associated together side by side in many of the compound grinders, are circumstances which seem rather to prove that the tooth substance, or ivory, once formed and protruded beyond the gum, undergoes no vital change till it is attacked by decay or worn down by attrition. Besides this, in all animals possessed of tusks, as the elephant, walrus, &c., the whole tusk is formed of ivory, and no part projecting beyond the bony cavity seems capable of being acted on by the vital forces,—much less the tip of the tusk. If the enamel membrane, again, were the agent of absorption of the older layers of ivory, this action of absorption would cease when the layer of enamel was worn down, and the ivory itself exposed to attrition—consequently, whenever this took place, the tooth would increase in length, in consequence of the absorption of the old layer not keeping pace with the deposit of new layers. We all know, however, that this enlargement does not take place, so that we are almost inclined to believe that no absorption of the layers of teeth take place after they have once been deposited. Teeth are not in the same conditions as bones. As the body enlarges it was necessary that some process should go on in the bones by which the child's bones might swell into the adult's. But with teeth this was not needed. They do not appear till the jaw has enlarged to make way for them, and after they are once protruded it does not appear that they enlarge in breadth, though for a time they enlarge in height so long as they continue to receive new layers from the central pulp.

These hints are thrown out in order that some experimenter may direct his attention to this point, the only one in all the elaborate work of Flourens which he seems to have left at all imperfect.

ART. IV.—*A System of Clinical Medicine*. By ROBERT JAMES GRAVES, M. D., M. R. I. A., &c. Dublin, 1848. 8vo, pp. 987.

THE present work is not perhaps entitled to the character of being entirely new; since its materials have been already for a considerable time before the profession, through the medium partly, of different periodical publications, and chiefly that of the *Medical Gazette*. But as it appears now for the first time, in a collected form, it must be regarded as one of those important acquisitions to the practical department of medical science, which may at once facilitate the knowledge of practical medicine, and animate the zeal of the medical student. A work of this kind and extent, also, proceeding from an hospital physician so zealous as Dr Graves, cannot fail to be received most favourably by all those who take interest in the progress and improvement of the healing art.

It may not be unseasonable here to explain shortly what is meant by Clinical Medicine, and by teaching medicine by clinical instruction. It is scarcely requisite, however, to dwell on the etymology of the term, which must be manifest to every one that knows that the term *κλινη* in the Greek language signifies a couch or bed, and that, consequently, the adjective derived from this must mean what relates to a couch or bed. By clinical medicine, indeed, is meant that study of the healing art, and that mode of conveying instruction, which can be pursued only by observing and examining the patients, and the symptoms which they present. It thus appears that clinical medicine implies the attentive study of individual cases; that clinical observation means that kind of observation of the phenomena of disease and the effects of remedies which can be effected only in individual patients; and that by clinical instruction is meant that kind of information which the teacher communicates by the constant reference to actual cases of disease before his own eyes and those of his pupils.

It must be at once manifest that there is a wide difference between clinical medicine thus defined,—and practical medicine, or that which is taught in a systematic and methodical plan in oral lectures or in books. In the former the teacher and pupil fix their eyes upon the facts of individual cases, upon individual examples of disease; and when they think of general facts and general principles, it can be only in reference to the illustrations, confirmations, and rectifications afforded by individual cases. In the latter the teacher is obliged to propound, to explain, and illustrate general facts and general principles, and can rarely descend to individual cases, unless where he wishes to illustrate or to enforce some of these general principles.

There are, indeed, two modes of teaching and studying almost

all sciences, and those branches of knowledge which, like medicine, admit of practical applications. One is by the analytical and empirical method, or by studying, collecting, and classifying individual phenomena and the facts of individual cases until they lead to certain general facts and general inferences. The other mode is the synthetical method, which is at once the reverse of the first plan, and is indebted to it for the materials which it employs in establishing and explaining the general principles. In the latter method, it is understood that all the most important and essential facts are already ascertained with a reasonable degree of accuracy, and that all those which are general are distinguished from those which are particular, or which seem exceptions to the general facts; and when this is accomplished, these general facts are classified and arranged in such order, that the knowledge of them may be most easily and clearly communicated to those who are studying the science and its practical applications. To the former of these methods of acquiring and communicating knowledge corresponds Clinical Medicine. The latter, on the other hand, constitutes Systematic Practical Medicine as it is taught in the writings of physicians and in lectures. Both possess great and peculiar advantages characteristic of each. Both are indispensable in a good and useful system of medical education. The one cannot well exist, and certainly cannot be either usefully studied or taught without the other.

While systematic medicine forms the most natural and easy mode of initiating the student into the knowledge of the principles and practice of the healing art, clinical instruction is not only useful in showing him these principles and rules carried into effect, but it makes him gradually and insensibly familiar with many practical details in the diagnosis, the prognosis, and treatment of disease, which no lectures, however full, no reading, however extensive, could communicate.

The value of clinical instruction appears chiefly in this circumstance, that it furnishes constantly the materials from which the principles and practical rules of systematic medicine are deduced, by which they are from time to time rectified and modified, and by which the truth of its principles is always most perfectly estimated and tested. Mere systematic principles, however correct at one time, are always liable to contain various speculative, if not hypothetical fallacies, to be deduced from erroneous or imperfectly ascertained facts, or from the imperfection of our means of information, to contain many chasms which are likely, in the hands of ingenious but hasty constructors, to become filled with suppositions and the creations of fancy. Hence these systems require from time to time to be examined, to be remodelled, to be rectified and accommodated to the new facts which experience and observation collect. It hence results that clinical medicine, or, in

other words, the observation of the phenomena of disease, and its effects, and the effects of remedial agents at the bedside of the patient, whether in the wards of the hospital or in the private sick-room, must ever form the safest and most useful guide to the physician in the construction of his general principles.

Again, it may be remarked, that clinical medicine is not only that which we are all obliged to cultivate to the latest period of our lives, and which must be cultivated as long as medicine is studied as a science and practised as an art, but it was the earliest form under which medicine was cultivated. When Hippocrates studied the votive tablets in the temple of Aesculapius, and observed the cases of remittent and continued fever in the islands of the Cyclades, he studied medicine clinically. When Symmachus went about the streets of Rome with his pupils, he taught medicine clinically. Rhazes, when he practised medicine at Bagdad, followed by crowds of admiring pupils, taught medicine clinically.

Clinical medicine, in short, bears the same relation to systematic practical medicine, that practical anatomy taught in the dissecting room bears to lectures on anatomy taught in the theatre, or that practical chemistry studied in the laboratory bears to the explanation of the principles of the science as delivered in the lecture-room.

These considerations will at once show that lectures on clinical medicine cannot well be delivered in any methodical order. The teacher cannot lay down a classification of the diseases incident to the human frame in classes, orders, genera, species, and varieties, and explain the distinguishing marks of each group in regular succession. He cannot take the order of fevers, inflammations, mucous inflammations, serbus inflammations, and similar tribes, and delineate the history of each. He has individual examples of disease to consider, to investigate, and to elucidate, as they are presented in the persons of actual living patients; and these he must examine in all their details and in all their peculiarities. His great duty is, from an assemblage of symptoms or external signs, to determine the nature and extent of the internal lesion; to explain to his pupils the mode of inquiry in this determination; to teach them how to do so themselves, and after this has been accomplished, to explain the prognostications regarding the probable course and termination of the disease; and to point out the most rational and efficient method of cure, or if this be impracticable, of alleviating the sufferings of the patient. In this process of observation, comparison, and deduction, it is quite manifest, that, as he begins with one particular case, or at most with one or two particular cases, he cannot in any part of his instructions depart much from them; all their common and general features he must notice; all their peculiar characteristics he must carefully explain; and, while it is the duty of the clinical teacher

to adhere closely to individual facts and phenomena, as they take place in individual cases, he can in no way enter upon the exposition and development of general principles, unless as they arise out of the individual cases which claim his attention. In short, while the systematic teacher explains general principles, and, to illustrate them, proceeds sometimes to the short notice of individual cases, the clinical teacher must follow an inverse course, and, beginning with individual facts, arise from them to the establishment of general principles.

The facts and considerations now adduced show that it is not easy to publish a course of clinical lectures or the general mass of clinical information communicated in one or two courses, in the same manner in which the information communicated in a course of systematic lectures is published. The mode adopted by different reporters has indeed differed a good deal. The reports of the Vienna school, which have been published by De Haen and Stoll have been entirely arranged in chronological order; that is, each set of cases, with the epicritical remarks made on them, have been given to the world in successive reports, according as season followed season. Much the same plan has been pursued by Peter and Joseph Frank in their several *Anni Clinici*, from Pavia and Wilna; and more recently by Speranza and Hildenbrand.

The first person of much note who, we believe, deviated from this chronological method, was Andral in his *Medecine Clinique*, published in 1828, in which he arranged under the same heads all the cases of similar or kindred characters, which had taken place during several seasons of clinical practice and instruction. This method has probably an advantage over the chronological in this respect, that it enables the author to observe greater unity of subject; to derive his illustrations from a more numerous body of facts; and consequently to pass with greater confidence from individual facts to general deductions. It is, we scarcely doubt, for some similar reason that Dr Graves has adopted a similar plan in the present work; and though it may be said to have originated in one course of clinical lectures, yet we are given to understand that it embraces the experience and information of several. Another circumstance, whether advantageous or not, which has resulted from this method of publication is, that the author has been thereby enabled to follow a mode of arrangement more conducive to concentration, and more useful to the reader, than the other mode furnishes. Whoever is familiar with the reports of De Haen and Stoll, knows that, for cases of particular diseases and examples of particular lesions, he has often to search over several seasons and several volumes. Had all these cases been placed together, it is impossible to doubt that the time of the reader must have been saved, and his labour abridged. In the work of Andral, in which all the cases of the same or similar character are placed to-

gether, the student finds the facts afforded by every variety of the same form of disease brought at one glance before him, and what is deficient or obscure in one case is supplied or illustrated by some of the others. The same arrangement in the present volume gives rise to the same results.

The present volume is further distinguished by some peculiarities also deserving attention. In clinical medicine the attention both of teacher and pupil is directed chiefly to the observation of facts, the question as to their being accurate and well established, or inaccurate and resting on an unstable foundation, and, in short, to the determination and the communication of facts rather than the discussion and examination of hypotheses, speculations, or even theories. The reason of this is obvious. All useful knowledge is founded on facts, and, as we have already said, all speculative and theoretical principles must derive their sole value from their correspondence with facts. When the facts are determined, the inferences which result may be easily applied to the formation of general or theoretical principles. The great use, however, of the clinical method of teaching and studying is to fix down the mind, as it were, to the task of observation, and amidst the natural tendency to speculate and generalize, either to prevent hasty and partial generalization, or by the constant accumulation of facts, to furnish so many and such a variety of them, that errors may be excluded, and as close an approach to the truth of nature as is practicable may be effected.

It thus appears that, in a course of clinical instruction, the consideration of speculative points is not very admissible, or is admissible only so far as their correspondence or discordance with well-known facts deserves attention. It is very likely, at all events, that, if much of this be introduced, it occupies time and study, which might be more profitably employed in the pure practical department. We find, however, that Dr Graves does not adhere in this strict manner to the business of clinical medicine. Availing himself, probably of the indulgence allowed or granted to the lecturer, he has brought under consideration many subjects which cannot be regarded as pertaining to the legitimate department of clinical medicine; thus we find remarks on several of the doctrines of Liebig, and a discussion of some length on the theory of inflammation.

The number of lectures in the present volume is forty-four. We ought to say, first, the work is divided into two parts; the first, the lectures, in number, forty-four; the second, a series of cases and observations on various important and interesting topics in pathology and therapeutics.

Of the lectures, three are introductory, and in these Dr Graves treats of various general matters which he conceives necessary to be known previous to entering on the proper business of clinical

medicine. The next fourteen lectures are devoted to the subject of continued fever. In the eighteenth lecture the author treats of yellow fever; and in the nineteenth, of intermittent fever.

Next come bronchitis, gangrene of the lungs, pleurisy, hæmoptysis, pulmonary apoplexy, and consumption, in three lectures. Syphilis, gonorrhœa, and the question of the use of mercury and its injurious effects, are treated in a series of seven lectures. Palsy is considered in its varieties in the thirtieth lecture; electro-magnetism in the thirty-first, and sleeplessness in the thirty-second lecture. Then comes inflammation and its theory in the thirty-third lecture; scarlet fever in the thirty-fourth lecture, and influenza in the thirty-fifth.

A subject rather complex, viz. the connection between diseases of different kinds, as gout, jaundice, and urticaria, is treated in lecture thirty-sixth; and lecture thirty-seventh is devoted to gout and its various forms.

After this the subjects treated in each lecture are multifarious and rather dissimilar, and not arranged in the same methodical order as already noted. Thus we find pleuro-pneumonia treated in the thirty-eighth lecture, and again in the forty-first. Syphilis and mercury receive further consideration in the thirty-ninth chapter; in the forty-third, ague and various of its effects are considered; and in the forty-fourth are treated the varied subjects of glands, farcy, furuncle and carbuncle, and *phlegmasia dolens*.

The first introductory lecture is of a general nature. The author explains the proper method of studying clinical medicine, and impresses the importance of studying chronic diseases; takes a view of the medical schools of Edinburgh and Dublin, especially the method of conducting clinical courses, then contrasts it with the method pursued in the German schools, and demonstrates the superiority of the latter. The Doctor, in this comparison, is rather severe on the unfortunate clinical school of Edinburgh, which is made to bear a very considerable amount of blame in issuing into the world imperfectly educated physicians. The description of the Edinburgh clinical establishment is avowedly taken from its state in 1819; and in a postscript, dated 1842, it is stated that 21 years have elapsed since the lecture was delivered at the Old Meath Hospital, that is to say in 1821. Whichever of these chronological statements is correct, we acknowledge that we neither know nor very much care; and we further acknowledge that we do not feel very great interest in the circumstance, whether Dr Graves has acted wisely in publishing to his pupils and the world in 1843, an account of the clinical ward visit as it was in 1819. Careless or useless methods of teaching we have never defended, and do not mean now to defend them. But it may not be improper to state various matters which will show how far the account here given is a correct picture. The account of the method

of clinical teaching, at that time in Edinburgh, is a matter of history, and as such, is valuable. There is nothing in that mode of teaching at that time, for which the Edinburgh teachers can have occasion to blush, excepting in the circumstance, that the part of the hospital, and consequently, the number of patients set apart for the purpose was too small. This objection was removed in 1824, by the enlargement of the clinical wards to more than double the number of beds, that is, from thirty or thirty-two beds to about seventy-six beds. It is idle to dwell on this, however, which is well known to every one who knows any thing of the Edinburgh school.

In the year 1829, another change was accomplished in the system of clinical teaching in Edinburgh, in the ordinary physicians to the hospital being allowed to deliver clinical lectures. This, after some changes varying in different years, has terminated in the senior physician in ordinary delivering annual courses of lectures on *Clinical Medicine*.*

Regarding the mode of conducting the clinical instruction, the following facts may be stated. Two courses of clinical lectures, of six months' duration, are delivered every winter in Edinburgh, and two courses of three months every summer on the patients treated in the Royal Infirmary. One course is conducted by four of the professors in the University, two visiting the wards and lecturing for three months in succession, after which these are succeeded by other two, who continue the visiting, reporting, and lecturing for a similar period. Each physician has the charge of about thirty-five, thirty-seven, or thirty-eight patients. One physician takes charge of the male patients; another of the female patients. Each physician is attended by one principal clerk, and two assistant clerks, selected by the physicians from among the senior pupils, and the choice afterwards ratified by the managers, and appointed for three months at a time. To the principal clerk, occasionally aided by the assistants, belongs the duty of collecting the history of the cases at admission, and giving an account of all the present symptoms, rational and physical. These are completed and rectified by the physician, if need be, either then or at subsequent reports. To the principal clerk, also, belongs the duty of entering the daily or occasional reports from the dictation of the physician at the bedside of the patient, and also the prescriptions of medicines or diet thought requisite for the treatment of the case; and at the same time the assistant clerk inserts the prescriptions in a separate book, from which, when conveyed to the laboratory after the visit, the medicines prescribed are prepared and distributed to the patients by the apothecary.

It is further the duty of the clerks to visit the patients in the evening, to observe any changes in symptoms, and, if need be, re-

* *Edin. Med. and Surg. Journal*, Vol. xlvii., p. 473 and 474.

port these to the physician, to see that the remedies prescribed at the visit have been administered, and to note their effects. It is also required that the clerks perform a morning visit, sometimes between ten and twelve, and collect the reports of such cases as have undergone considerable changes, either for the better or the worse; in order that all may be inserted in the register at the hour of visit. Four lectures, that is two by each physician, are delivered every week in the winter season upon the cases thus visited and reported on, and two in the summer season.

The senior physician conducts his course much in the same manner. He also is attended by one principal clerk resident in the institution, and elected by the managers, but always more or less on his own recommendation, or with his concurrence; and one or two assistant clerks, as the cases require, appointed by the physician himself, for a period of six months, or at least three months. To the principal clerk belongs the duty of collecting and redacting the history of the cases, noticing the present state of the rational and physical signs, and inserting them in the journal; where they are either modified, rectified, or amplified, as the circumstances may be, by the physician at his visit, or in subsequent reports. Occasionally the assistant clerks aid the principal clerk in this duty. Their other duties are the same as in the case of the clinical clerks; and they have, besides, to perform blood-lettings, to introduce catheters, and various small operations which the treatment of the cases requires. The only remarkable difference between the principal clerk of the senior physician and the clinical clerks, is, that he is generally further advanced in his studies, and consequently can devote more undivided attention to the cases than the others can. This is insured by the regulations relating to the qualifications of resident clerks; and it has happened very often, if not almost invariably, that every one of the resident clerks to the present senior physician has been previously a clinical clerk for three or six months in the clinical wards.

On the cases treated, and reported in the manner now mentioned, three lectures are delivered every week, or about sixty-four lectures in the course of six months, besides from twenty to twenty-five demonstrations in morbid anatomy on the fatal cases.

The great objection which Dr Graves urges against the Edinburgh method, is, that "it is a pity to find so much labour and diligence thrown away; for it is evident that the practice of medicine cannot be thus taught or learned as it were by hearsay; and it is consequently to be feared that many are annually dubbed doctors at Edinburgh, who have been scarcely ever called on to write a prescription."

With the greatest deference for the opinion of Dr Graves we cannot agree with him in thinking that the labour and diligence, which are employed in observing and recording the phenomena

of diseases and the effects of remedies, can be thrown away. These facts and phenomena are pointed out to the pupils; and in their presence they are verified and recorded; and if there be any other mode of gradually initiating the pupils in the business of observing and treating disease, without detriment to the patient, we shall be most happy to see it explained and put in practice.

As to the fear expressed by Dr Graves, "that many are annually dubbed doctors at Edinburgh who have been scarcely ever called on to write a prescription;" this may have been the case when Dr Graves studied; but it is well known that it not so and cannot be so at present. For many years past part of the second examination for the degree consists in requesting the candidate to show his knowledge in the art of prescribing, by writing prescriptions, for various medicines, as they are required to be administered for different purposes in the treatment of different diseases. In addition to this, the regulation which requires from candidates six months of dispensary practice must also prevent so great an amount of incapacity.

Dr Graves further adds, "The chief objection to this mode of teaching is that, however well inclined the student may be, he is never obliged to exercise his own judgment in distinguishing diseases, and has no opportunity of trying his skill in their cure; and, consequently, at the end of his studies he is perhaps well-grounded in the accessory sciences, is a perfect medical logician, able to arrange the names of diseases in their classes, orders, and different subdivisions; he may be master of the most difficult theories of modern physiologists; he may have heard, seen, and, if a member of the Medical Society, he may have also talked a great deal; but at the end of all this preparation, what is he when he becomes a full doctor? a practitioner who has never practised."—P. 5.

For all these evils the remedy suggested by Dr Graves is, we understand, to be found in the German system of clinical instruction, of which the following account is afterwards given at p. 9.

"There is one clinical hospital for the treatment of acute diseases, and another for chronic diseases, while a clinical dispensary is devoted to the care of extern patients. The pupils are divided into two classes—the more advanced, who get the care of patients, and the junior students, who merely look on and listen. When a patient is admitted, his case is assigned to one of the practising pupils, who, when the physician is visiting the ward, reads out the notes he has taken of the patient's disease, including its origin, progress, and present state. This is done at the bedside of the patient; and before he leaves the ward, the physician satisfies himself whether all the necessary particulars have been accurately reported by the pupil. After all the patients have thus been accurately examined, the professor and his class proceed to the lecture-room, and a list of the patients and the practising pupils is handed to the professor: the cases admitted that day are first inquired into, and the pupils are examined concerning the nature of their diseases, their

probable termination, and the most appropriate method of treatment,—each student answering only concerning the patients entrusted to his special care. During this examination, the pupil's diagnosis and proposed remedies are submitted to the consideration of the professor, who corrects whatever appears to be erroneous in either, and then the student retires to write his prescriptions, while the rest of the cases and pupils undergo a similar examination. At the conclusion, the prescriptions written by the students are read out in order by the professor, who strictly comments on and corrects any inaccuracy or inelegance they may contain. When the prescriptions have been revised and corrected, they are signed by the physician, and handed to the apothecary to be made up and distributed. In some clinics, the price of each medicine is affixed to the bottle or box containing it, in order that the students may become acquainted with the comparative expense of various prescriptions, and may thus be enabled, in private practice, to accommodate, as far as possible, the expense of the remedies to the circumstances of their patients. The clinic for extern patients is conducted on the same principles: patients who are able to attend, are examined at the dispensary; those who cannot leave their homes are visited by the senior practising students, who always seek the advice of the professor when the case is urgent, or the treatment doubtful."—Pp. 9, 10.

Now we do not deny that the method represented here to be pursued by the German teachers presents several advantages which are not furnished by the Edinburgh method. It assuredly obliges the pupils to come more closely in contact with the cases of the patients, to exert themselves in thinking over the symptoms and considering the nature of the disease or diseases under which they may labour, and, consequently, to render them familiar with all the possible internal causes of external symptoms, and the means of promptly distinguishing similar disorders. Whether it really makes them better practitioners or not, we have no means of determining. There is simply one objection to its use, which Dr Graves will have the goodness to take into his serious consideration, and if he can get it removed, it will give pleasure to none more than ourselves.

What time the German students have on their hands to devote to clinical study, we know not. But we know well that the great body of the Edinburgh students have, in the present state of the curriculum, which some people think too long and too burdensome as it stands, no time for the examination described by Dr Graves. Clinical medicine is usually studied the fourth or last year; and after attending the visit for one hour, and seeing the cases examined and reported on, all of them have other classes or engagements to attend to, so that, till the hour of lecture, three hours after the visit, they are occupied in such a manner, that this species of examination is impracticable. The morbid inspections or abductions, as they are called, also take place immediately after

the visit, and they think they do a great deal, when they spend this hour in the theatre at the average of twice in the week.

Another circumstance closely connected with this is the fact, that of the fourth year's pupils, few are capable of examining cases and forming an opinion on them in the short time allowed in the business of a large hospital. Though several have perhaps been engaged in some practice, yet to the majority it is new, and consequently not easy.

It thus appears that the error, if error there be, lies not with the teachers, but with the public boards. The only mode in which the plan recommended as so superior by Dr Graves could be carried into effect, is to direct that students shall spend one year, or at least six months longer, at an hospital where there are ample opportunities for examining patients in the deliberate manner required by pupils, and subsequently ascertaining the accuracy of the conclusions drawn by them. It is quite clear, that, in the present state of the profession, the students will not voluntarily subject themselves to this additional labour, occupation of time and outlay of money. What is the usual character of medical students in Dublin, and in the medical schools of Germany, we know not. Here they are decided utilitarians, and utilitarians with not unfrequently limited views of real interests. We say not this to depreciate the judgment or characters of medical students more than other members of society. But if the truth must be told, they partake largely in the utilitarian spirit of the age. The great object is to pass the boards, to comply with the conditions by them required, and after this, the rest they leave to kind Providence, and that page of the world's history, entitled the chapter of accidents. No consideration will induce them, that is, the great majority, to spend more time, or more labour, or more money than are requisite for the great purposes above-mentioned. One or two, now and then deeply impressed with the value of clinical instruction, does perhaps continue to attend a clinical course after finishing his or their prescribed course of studies. But these are the exceptions; the others who do not are the rule.

Let us not, nevertheless, do injustice to the hospital pupils. It is right to say, that, notwithstanding all that Dr Graves asserts, and which may be accordant with the facts at the time at which he studied, his observations are, he would find, by no means applicable to the present generation. For a long series of years past, we have observed the students as anxious to learn as we were to teach, availing themselves most diligently of all opportunities of becoming personally familiar with the method of examining patients, ascertaining their symptoms, the origin, course, and duration of the disease, the effects of remedies, and, indeed, every thing calculated to throw light upon the cases. It is not an uncommon practice for several of the pupils to go round the wards in the morning with the senior clerk; and very common to examine

those of the patients whose symptoms do not preclude such examination, immediately after the physician has done. It must also be remarked, that many of them are not the uninquiring and unobservant persons which, from the account of Dr Graves, they might be inferred to be. Not only do they observe the progress of cases and reason upon them, but they often propose questions, which no one without thorough acquaintance with the cases, could propose. In short, while we allow the method recommended by Dr Graves to have certain advantages, we must further be permitted to say, from personal knowledge of its operation, that the present method is also perfectly capable of initiating the diligent student into the practical knowledge of the healing art.

Under every view of the question it is quite manifest that the present method pursued in the Edinburgh school can by no means be dispensed with. It is, indeed, the grand means by which the pupil is initiated and perfected in the art of diagnosis, prognosis, and therapeutics. Without it the neophyte could never acquire the practical elements even of diagnosis and therapeutics; and from it the advanced pupil may derive great instruction. While, therefore, it appears to us that the present system could not be safely put aside, the only improvement of which it admits, is to have it extended and accommodated to the wants of the advanced pupil. This must, however, be left to the public boards, who alone have the means of enforcing this new and additional form of clinical instruction.

Further; *surgit amari aliquid*. In making any change so important as that suggested by the remarks of Dr Graves, another body requires to be consulted, and other considerations require to be examined. We allude to the Directors and Managers of Hospitals, and the interests of the patients. We believe that there are some persons in this world who never think of the interests of hospital patients; or if they do, it is to look on them in the light of animal machines, chiefly useful in showing the influence of morbid agents, and the operations of disease, and trying the effects of remedies. On the good or the evil, the merit or the demerit of this mode of proceeding, we give no opinion. We only beg to remind all those who do entertain such views, that the persons admitted into hospitals are all fellow-creatures, have souls as well as bodies, have feelings as acute, and as easily moved as others, and that the only way in which we can form a distinct and just idea of the nature and operation of these feelings, is to suppose ourselves placed in the same position, suffering the same diseases, and obliged to have recourse to the same means for relief.

In Edinburgh, and we believe in most other cities and towns in Great Britain, the founders and directors of hospitals have always made the first object in the establishment of their respective institutions, to be the cure or the relief of the sick and diseased, or injured poor, and this in the most humane manner. To the ful-

filment of this object, they have directed all their cares ; on this in Scotland they have expended all their pecuniary resources ; and to this they have devoted all their available time, and all their energies. The education of medical students, the establishment of courses of clinical lectures, and the application of the cases to the purpose of promoting the progress of medicine, have at all times been held as secondary objects, subordinate to the great primary one of the welfare of the patients.

We know that by many it will be argued that the two objects are quite compatible, nay, that where the business of clinical teaching is most zealously carried on, the cases of the patients are most ably treated, and their general welfare most perfectly secured. This is perhaps true in certain circumstances ; and it cannot be denied that, as an abstract proposition, it appears most natural to think, that wherever much attention is devoted to the correct and systematic diagnosis, and the proper treatment of cases, the patients must be more carefully attended to than in other circumstances, where these objects are less prominently kept before the eyes. It is, indeed, in the abstract statement, something like a truism. All experience, nevertheless, shows, that in practice it is not so, nay, that it is in some instances most grievously contradicted ;—and that, in a large proportion of cases of disease, both acute and chronic, the examination of patients before many pupils, by several persons, and at repeated times, exerts a most detrimental influence upon their symptoms. Much, no doubt, depends on the manner in which this done, whether harshly and unfeelingly, or with gentleness and kindness. But it cannot be denied that the method pursued in the foreign hospitals is calculated to beget a cold, indifferent, and not uncommonly, cruel manner of examining, interrogating, and treating patients labouring under serious organic lesions.

Even the bustle, the noise, and the parade, which are sometimes thrown into the visit of a public hospital, are circumstances of which an unsophisticated mind can by no means altogether approve, and which, it is impossible to deny, must be detrimental to many cases, where rest, quiet, and absolute tranquillity are necessary to recovery. The evils, indeed, which may result from a clinical visit performed with little regard to the feelings of patients, and the peculiar circumstances of individual cases, naturally and forcibly recal to the mind of the classical reader that epigram of Martial, in which a distinguished and fashionable Roman physician is doomed to a disagreeable species of immortality.

Languebam ; sed tu comitatus protinus ad me
 Venisti centum, Symmache, discipulis :
 Centum me tetigere manus, Aquilone gelatas ;
 Non habui febrem, Symmache ; nunc habeo.

Lib. v. Epigr. 9.

Symmachus lives in the verses of the epigrammatist; and how many, may it be asked, are entitled to the same distinction.

It cannot, therefore, be matter of wonder, that those to whom the superintendence and guardianship of public hospitals is committed, should be doubtful of the expediency of great changes in the departments of teaching connected with these establishments. They must be first satisfied that the patients shall not, at all events, be worse off than they previously were; and that, in authorizing any changes, the interest of the pupils is not to be preferred to that of the patients. Unless this were quite established, it is clear that no public body can sanction the introduction of an innovation like that carried on in the German hospitals.

In short, in a matter like the present, in which not only the advantage of medical science, but the interests of our fellow-creatures are concerned; zeal for the interests of medical students requires to be tempered with a little judgment, and the admixture of humanity for the patients. If the system of instruction by the pupils examining individual patients can be accomplished without injury to the latter, then it cannot be wrong or dangerous to adopt it. If, however, this mode of procedure aggravates the natural and necessary evils of hospital treatment and clinical visits, no doubt can be entertained which party ought to give way.

We have in this argument given Dr Graves the benefit of his statement, that the physicians reared under the system of clinical instruction pursued at Edinburgh are indifferent practitioners, and know little or nothing of diagnosis and treatment. A question, nevertheless, naturally arises, what is the proof of this? How have the physicians of the army, the navy, and the cities and towns of Great Britain and the colonies been educated during the last eighty years.

Here, however, for the present, we must pause. We have been led, almost unavoidably, by the subject of the first lecture of Dr Graves, to consider the best methods of teaching clinical medicine, and to inquire into the practicability of the new German method in the present state of medical education. This has prevented us from entering on the examination of the materials of the present volume. We may here say, that these materials are important, and if not always new, they are generally useful. The work is animated throughout by a spirit of zeal and enthusiastic ardour, which could only proceed from a lover of his art. Confidence also we see often in a degree that must make its possessor a happy man indeed. We hope at some future period to have an opportunity of directing the attention of our readers to the mode in which several of the subjects are considered by Dr Graves. Meanwhile we can safely recommend it as a work of much information on pathology and therapeutics, and well deserving of careful perusal.

PART III.

MEDICAL INTELLIGENCE.

ANATOMY AND PHYSIOLOGY.

On the Movements of the Heart. By M. MONOD. (*Bulletin de l'Académie de Médecine*, 7th February 1843.)—M. Monod had an excellent opportunity of examining the movements of the heart in an infant, which was born with thoracic ectopia, the parietes of the thorax being deficient, and the heart being visible to the eye. The pericardium also was wanting. The child lived 14 hours, but during this time many important facts were ascertained.

The contractions of the ventricles of the heart did not take place over its whole surface at the same moment, but progressed from the base to the apex; at the same time the organ became of a pale colour, its surface wrinkled, a movement of twisting from right to left was observed, and lastly, the apex of the heart was carried upwards and forwards.

The diastole presented the same phenomena, but in an opposite order. The heart relaxed suddenly; then the ventricular cavity became filled with blood, swelled out, became elongated, and the apex was projected downwards. If the total duration of these two movements were divided into four equal spaces of time, it would be seen that the systole occupied three of these, the diastole only one.

The contractions of the auricles commenced in their free appendices; but in them the duration of the contraction and relaxation were in the inverse ratio of those of the auricles. The systole, or contractions, occupied only one-fourth of the time, the diastole, or relaxation, three-fourths.

With regard to the order of the succession of movements, both ventricles contract at the same time, and both relax together; it is the same with the auricles. There are two periods of repose; one, which is the shortest, is between the first and second sound; the other, which is the longest, between the second sound and the first.

In this case the maximum of intensity of the first sound did not occur at the base of the ventricles, but at the middle of their fleshy walls; and M. Monod thinks that it was caused by the shock of the walls of the ventricles against the internal fleshy columns at the moment of contraction. As to the second sound, he thinks it was due to the return of the wave of blood against the sigmoid valves.

Blood Corpuscles of the Stanley Musk-Deer. (Abstract of a paper read by Mr GULLIVER at the Zoological Society of London, May 9, 1843.)—The size of the blood discs of the different species of the genus *Moschus* has become an interesting question, since Mr Gulliver has formerly shown that the blood discs of the Napu musk-deer (*Moschus Javanicus*, Pallas,) are minuter than those at present known of any other mammal.

He now announces that the blood discs of the Stanley musk-deer (*Moschus Stanleyanus*, Gray,) have an average diameter of $\frac{1}{10835}$ th of an English inch.

Hence they approximate very nearly in minuteness to those of the Napa musk-deer.

Some measurements of the smallest blood corpuscles of mammals will be found in the Edinb. Med. and Surg. Journ., No. 153, Vol. lviii. page 494.

Blood Corpuscles and Spermatozoa of the Camelidæ.—In the proceedings of the Zoological Society of London, Part 10, 1842, p. 191, Mr Gulliver has given some observations on the blood discs of the camel, (*Camelus Bactrianus*), from which it appears that their average long diameter is $\frac{1}{5145}$ d, their short diameter $\frac{1}{3876}$ th, and their thickness $\frac{1}{13110}$ th of an English inch.

After M. Mandl had discovered the oval shape of the blood discs of the paco and dromedary, Mr Gulliver ascertained that those of the vicugna and llama have the same figure, (see App. to Gerber's Anatomy, p. 10 and 43;) and he now shows that those of the bactrian camel are similar.

This completes the history of the blood corpuscles of this curious ruminant family, to which, as far as we yet know, the oval blood discs of mammalia are confined. The anomaly is very remarkable, especially as Mr Gulliver's observations have shown that the marsupial animals have blood discs of the usual circular figure. See Dr Willis's Translation of Wagner's Physiology, part 2, p. 234, note.

At the meeting of the Zoological Society, April 11, 1843, Mr Gulliver read an account of the spermatozoa of the canal, confirming that which he had before given of those of the dromedary, (see Edin. Med. and Surg. Journ., No. 155; and Proc. Zool. Soc., Part 10, p. 101,) viz. that they nearly resemble those of several other mammalia, and are not, therefore, allied in type to the spermatozoa of the oviparous vertebrate animals. The fact is curious when the remarkable coincidence of form between the blood corpuscles of the camelidæ and of the lower vertebrata is considered.

On the relations of the Grand Sympathetic with the rest of the Nervous System. By MM. VOLKMANN and BIDDER. (*Froriep's Notizen*, Vol. 21, p. 20.)—MM. Volkmann and Bidder, in studying the structure of the grand sympathetic of the frog, have traced its fibres, by means of the microscope, to ascertain what were its relations with the nerves of the cerebro-spinal system. The facts which they have observed have convinced them that the grand sympathetic forms by itself an independent system which takes its origin in the ganglia.

The fibres of the grand sympathetic are distinguished by the following characters from the fibres of the cerebro-spinal system. They are paler, do not in general exhibit double bendings, their granular contents are less abundant, united in bundles they exhibit a yellowish grey colour, and their fibres are more slender. In the places where the grand sympathetic communicates with the spinal nerves, there may easily be distinguished, by means of the microscope, two orders of fibres. What Remak has described as sympathetic fibres are only fibres of cellular tissue in an inferior degree of development.

If the points where the filaments of the sympathetic communicate with the spinal nerves be examined, it is seen that the first do not only direct themselves towards the centre of the second, but also towards their circumference. On measuring with care these bundles MM. Volkmann and Bidder found that the amount of the peripheral bundles surpassed greatly the amount of those which were directed to the centre of the spinal nerves; from which they concluded that these bundles could not be considered as roots, but as simple filaments of communication.

On the other hand, if the sympathetics arise from the spinal marrow

there ought to be found among the roots of the spinal nerves fibres belonging to this nerve. But if the roots of the spinal nerves are examined there is scarcely found one sympathetic fibre among fifty medullary fibres, although a large number ought to be found if the sympathetic arose from the spinal marrow. The delicate fibres of the central bundle of the communicating branch can only be traced to the spinal ganglion in which they originate. In general the ganglia, both of the spinal nerves and of the sympathetic system, are the principal sources whence the fibres of the sympathetic system take their origin. The spinal ganglia give origin to the sympathetic filaments, destined for the posterior branches of the spinal nerves; a circumstance which argues in favour of Weber's hypothesis on the uses of these ganglia.

PATHOLOGY.

On the Anatomical lesions of the Nervous System in Tetanus. By M. IMBERT GOURBEYRE. (*Archives Generales*, April 1843.)—A person who died of tetanus at the Hotel Dieu presented the following morbid lesions of the nervous system. Numerous ecchymoid spots were noticed on the external surface of the dura mater covering of the spinal marrow, and a collection of liquid blood occupied about five inches of the lower extremity of the spinal sheath. The spinal marrow was shrunk and softened in its two upper thirds, and the pia mater could not be dissected from it at this part, it adhered so closely to the softened spinal cord. This softening continued to the level of the occipital hole, and ended at the anterior pyramids. The anterior and middle lobes of the left side of the brain were found also softened, and the vessels of the pia mater were injected over the same part. The tetanic affection had come on after a fracture of the limb. The corresponding sciatic nerve was found to be finely injected, and faintish ecchymosed spots were here and there remarked.

M. Gourbeyre has collected a few facts on the same subject from the observations of others, both physicians and veterinary surgeons, from which, it appears, that softening of the cerebro-spinal axis, and especially of the anterior columns, with effusion of blood into the spinal canal, are of pretty general occurrence in tetanic affections. Inflammation of the nerve, leading from the injured part, which was the cause of the tetanic affection, as characterized by injection of its blood-vessels, occasional scattered ecchymosed spots, a dead lustre, and occasional softening were also frequently observed.

On the Existence of Entozoa in the Shut Cavities of Living Animals. By THOMAS STRATTON, M. D., Edinburgh. (*In a Letter to Sir GEORGE BALLINGALL, M. D.*)—While in former times, attention was given to considering the origin of vermes found in the intestinal canal, whether they came from without, or were produced within the body, in later times, they have been found inhabiting the serous or shut cavities of various animals. Thus, what is in several respects very curious, the eye of the horse is sometimes tenanted by a living object; the *Filaria oculi* is "not unfrequently found in the eye of the horse," (Dr Arthur Farre in *Library of Practical Medicine*, Vol. v. p. 252, 1840; and "the echynorhyncus has been occasionally found," "even in the peritoneal cavity of animals," (Dr W. B. Joy, in the *Cyclopædia of Practical Medicine*, Vol. iv. p. 504, 1835.)

In the lines below I shall give some minute details, the reason of which will be seen by what shall follow.

At Kingston, Canada, on the 6th of February 1841, hearing that a small-sized bitch, belonging to an acquaintance of mine, had been maliciously drowned in a hole in the ice, and that she was with pup, I thought I should amuse myself with looking at the state of the uterus. Accordingly, with

some difficulty, I got it out of the hole in the ice, now refrozen over, and commenced opening the animal, which had been now forty-eight hours drowned; it was frozen stiff, having a coating of ice; she was not with pup, the large size depending on fat; the uterus was small. On opening the cavity of the peritoneum there were seen four worms lying in it; they were alive and moved for some time after being taken out; they were of a round shape, a light-brown colour, the longest $8\frac{1}{4}$ and the shortest 6 inches long, having a diameter of about 3 or 4 lines, one extremity being rounded and the other a membranous disk.

My first impression was that they might have perforated the intestines, in which case there would likely be foreign matter in the peritoneum, with inflammation of this membrane;—however, its vascularity was natural, and also its serum was of an ordinary quantity, (it was turned into ice.) I then looked for some opening into the peritoneum, but could find none; then I examined the intestinal canal in its whole length, but it seemed to be entire.

On the supposition that the vermes had passed from the intestinal into the peritoneal cavity, by some opening which had eluded discovery, it would have been likely that other worms would be found in the intestines; this, however, was not the case.

The animal was drowned, not on account of being diseased, but by some one who bore some malice to its owner, and putrefaction had nothing to do with the appearance, as only forty-eight hours of a Canadian winter elapsed between its death and the examination.

Having now given the facts of the case, I come to the theory. The question to be answered is, how did these vermes get into the peritoneum;—were they produced there, or did they pass in from without? The idea of spontaneous generation is contrary to the whole analogy of nature, and cannot be entertained. That they passed in from the intestinal canal is very unlikely, as other matters would have followed them, producing inflammation and death. May it have been that the ova passed into the stomach, taken up from the intestinal canal by the lacteals, conveyed by the thoracic duct to the veins, and transmitted by the arteries, were deposited by the exhalants in the serum of the peritoneum?

However, as the animal was a bitch, there is some possibility that they passed from the uterus along the Fallopian tubes.

This instance shows that, in the lower animals, there is less sensibility to foreign irritants than in man; and it illustrates the general law, that living tissues accommodate themselves to living animals.

My friend Dr Lawrence Martin (of Dundalk and of the Royal Navy), was along with me when I opened the animal.

In the summer of 1841, being on a visit home, I gave specimens of the vermes to Dr Knox and Dr G. Aitken in Edinburgh, and to Professor Owen in London.

Kingston, Canada, December, 1842.

Blood diseased in Glanders. By M. RENAULT. (*Bulletin de l'Academie Royal de Medecine*, 7th February 1843.)—M. Renault made a number of experiments to ascertain whether the blood of an animal, labouring under glanders, could communicate the disease to a healthy animal. A horse was inoculated with pus taken from a man labouring under glanders; the horse was soon thereafter seized with the disease. Before killing it a quantity of blood (10 fluid ounces) was taken from its jugular vein, and injected into the veins of a healthy horse. At the end of three days this horse was seized with acute glanders; and blood drawn from it, and injected into the veins of another healthy and vigorous horse, in its turn produced acute glanders also in three days. From these and such like ex-

periments, M. Renault concludes that the blood is essentially diseased in this fearful malady.

THERAPEUTICS.

Suggestion for the employment of Belladonna to relieve certain symptoms in trismus and hydrophobia. By THOMAS STRATTON, M. D., Edinburgh. (*In a Letter to the Editor of the Edin. Med. and Surg. Journ., dated Kingston, Canada, 22d December 1842.*)—When man is attacked by that kind of tetanus named trismus or by rabies, the distressing symptom of spasm of the muscles of the throat not only causes the greatest suffering to the patient, but renders difficult or impossible the exhibition of medicines by the mouth.

In tetanus the first symptoms are, a stiffness of the jaws and a sense of uneasiness about the root of the tongue, "which first impedes and at length entirely interrupts the power of swallowing." (Dr Craigie's *Practice of Physic*, Vol. ii. p. 1209. Edinburgh, 1840.)

In rabies, "during the attempt to pass liquids over the base of the tongue, convulsive motions may be observed in the larynx and pharynx, &c." (Dr Craigie's *Practice of Physic*, Vol. ii. p. 1225.)

These diseases are somewhat allied by this common symptom, which in the latter named hydrophobia or the dread of water, might, with a little generalization, be called aryphobia (or aruophobia,) the dread of swallowing.

Reflecting on the physiological effect of belladonna in dilating the pupil by relaxing the muscle of the iris, it has occurred to me that a corresponding pathological effect might result from the external application of the extract of belladonna to the throat and neck; by relaxing the muscles of the pharynx, and it might lessen or remove the spasms and open the passage for the exhibition of internal remedies, by restoring to the patient the power of swallowing.

Belladonna is not suggested as a remedy for these diseases, but only for one of their symptoms, which from analogy one may imagine might be temporarily relieved in some cases.

Acetic Extract of Cantharides. By M. SOUBEIRAN. (*L'Experience*, 20th April 1843.)—The acetic extract of cantharides has been long used in Germany, and is considered as the best and most efficacious preparation yet made. This preparation is made in the following manner: take 4 parts, by weight, of cantharides powder; 1 part of concentrated pyroligneous acid, and 16 pints of alcohol; digest at a temperature of about 90°; express the fluid; filter and distil off the alcohol at a gentle heat. A syrupy-looking extract, of a buttery consistence, is left—the acetic extract of cantharides. It is powerfully vesicant. It is only necessary to spread a thin film over paper, and apply it directly to the skin, when it rapidly causes free and full vesication. The presence of the acetic acid in this preparation prevents the cantharidine from crystallising,—a circumstance which is a great inconvenience in the ethereal extract, rendering its application not always certain.

SURGERY.

On the Practice of Marking Deserters. By THOMAS STRATTON, M. D., Edinburgh. (*In a Letter to the Editor Edin. Med. and Surg. Journ., dated Kingston, Canada, 7th December 1842.*)—When sailors mark their initials and fanciful objects on their arms, they take a number of needles, fix them firmly in the end of a small stick, prick on the skin the intended figure, and then rub it over with gunpowder, the charcoal of which remains in the pricked spots, unremoved by the absorbents; sometimes they use

Indian-ink instead of gunpowder. The process is very painful, the arm bleeds a good deal, and to complete the figure of a mermaid, repeated application of the bunch of needles is required. I have several times seen ulcers of six or seven weeks' duration, caused by this practice of tattooing.

Early in the winter of 1841-2, I happened to be at the Line-hospital here, (then occupied by the 14th Infantry,) when they were marking several deserters with a D in the usual manner with needles, the men operated on, complained very much of the pain, and of the long time it took to be finished, and it occurred to me that it would be a much better plan to have a number of needles arranged in the shape of the letter D, and fixed in a frame, and that they should fly out by touching a spring, (a modification of the kind of spring in the cupping-instrument). In this way, the thing might be done instantaneously, and the colouring substance might be rubbed in after a single application of the instrument. For, if deserters are to be marked at all, it would be better to do it in the speediest and least painful mode.

There were in the hospital at the time, Dr James Johnston, Staff-assistant-Surgeon, (now of the 71st Highlanders), and Dr William Ord Mackenzie, 1st Kings Dragoon Guards; with the latter I left the building, and on our way along the street I mentioned my idea to him; I forget whether I mentioned it to Dr Johnston whom we left in the hospital.

On the 16th of July 1842, (six or seven months after), I saw in a London newspaper of June, a notice of an instrument of this kind, on exactly the same principle that had occurred to myself. My reason for obtruding these particulars is, that, after my mentioning the invention to Dr Mackenzie and others for some days afterwards, it may in the course of conversation have travelled through a number of persons, and so reached London. However, in the meantime, I beg to state that I conceived the idea of it, and mentioned it to a number of persons about half-a year before there was any account of it in the newspapers; from the instrument-maker who may be employed to make it, I shall be able to learn whether it was his own invention, or communicated to him by one of the many who heard of it here.

My friends Dr Mackenzie and Dr Johnston, fellow students and graduates in the same year, will pardon my mentioning their names in this public manner, which I do only because, I distinctly remember speaking to Dr Mackenzie on the subject.

It is only some of the men convicted of desertion that are branded, the mark is done by a serjeant, in the presence of a medical officer, and below the left axilla or on the left arm; it is in case the man should desert a second time and offer to enlist, and as the purpose of knowing him again would be equally well answered by branding him on a less conspicuous part of the body, the upper and inner part of the thigh would perhaps be a better spot for placing this sign, than the breast or arm.

In the navy and in the marines when embarked, there is no marking of deserters; in the marines when on shore, the custom is the same as in the line.

THE
EDINBURGH
MEDICAL AND SURGICAL JOURNAL.

1. OCTOBER 1843.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*Notice of a Case of Cyanosis, or the Blue Disease, connected with mutual adhesion of the semilunar Valves of the Pulmonary Artery.* By DAVID CRAIGIE, M. D., &c., Senior Physician to the Royal Infirmary. (Read at the Fourth Evening Meeting of the Royal College of Physicians.)

SINCE the time at which William Hunter* and Dr Pulteney† recorded their cases of direct communication between the right and left sides of the heart, and solicited the attention of physiologists to the consequent effect of that communication, in preventing the proper coloration of the blood in the lungs, and the other changes required by the healthy condition of that fluid, many different instances of different degrees of *Cyanosis* have been published, all tending to throw more or less light upon the lesion in a physiological and pathological point of view.

The case published at Leyden by Sandifort, in 1777, which had been seen by Gaubius in the year 1769, and by Hahn in 1776, attracted much attention, and suggested to that anatomist various interesting and important observations, which have been more or less fully repeated by subsequent authors. This case does not, however, appear to have been known to English physicians till long after its publication, as no mention is made of it till after the lapse of several years.‡

For the first systematic views on this lesion we are indebted to Corvisart, who, in his classical work on the Diseases of the Heart, has collected chiefly from a dissertation published by M. Cailliot of Strasbourg, several cases, previously little known, in illustration

* Medical Observations and Inquiries, Vol. vi. Art. xxvii. 1783.

† Transactions of the College of Physicians, Vol. iii. Art. xxi. 1785.

‡ Ed. Sandifort, *Observationes Anatomico-Pathologicae*, Lugduni Bat. 1777. Cap. I. de rarissimo Cordis vitio.

of the pathological varieties which the lesion assumes.* From these facts it resulted that the symptoms known, not very accurately, under the name of *Cyanosis* and *Morbus Cæruleus* might depend not only on, 1st, the open or patent state of the *foramen ovale*, but on perforation of the *septum cordis*, congenital or acquired; 2d, on the aorta arising in such a manner that its orifice corresponds to a congenital aperture in the septum; 3d, on the aorta arising from the right and left ventricle at once, as in the case recorded by Sandifort and Dr Nevin, and the 47th case of M. Gintrac, the case of M. Olivry; and the case recorded by Dr George Gregory; 4th, on the pulmonary artery arising from the left ventricle, while the aorta arose from the right, as in the case recorded by Baillie; or 5th, on the aorta and pulmonary artery rising from the left ventricle, as in the case recorded by M. Marechale; or 6th, on the circumstance of there being only one auricle and one ventricle, the latter giving rise to one trunk, which afterwards divides into the aorta and pulmonary artery.

An account, at once more complete, and at the same time digested with greater precision, was soon after given in 1816, by Kreyzig, Professor of Medicine at Dresden, who observed the occasional contraction or narrowing of the pulmonary artery, which, though in some cases seen, had not been often noticed. He is the first who appears to have attached due importance to the arctation or closure of the pulmonary artery.† Other monographical treatises on this lesion are, a dissertation published by Charles Frederic Haase at Leipzig in 1813,‡ and another published at Gottingen in 1816, by John Charles Hein.§ About the same time, viz. in 1814, M. Gintrac published on these cases a good dissertation, which he, in 1824, expanded into a complete monograph, embracing all the cases known up to that time.|| He has devoted particular attention to the state of the pulmonary artery, which was more or less contracted or narrowed in sixteen of fifty-three cases, and in five more obliterated. The latter lesion, it may be believed, is rare; because it is difficult to conceive how life can be continued, even with great arctation, much less obliteration of the pulmonary artery. In point of fact, of the five cases presenting what M. Gintrac calls obliteration, one was in an infant who lived only seven days, the case communicated by Mr Hodgson to Dr Farre; another took place in a child who died in the fifth month, whose

* *Essai sur les Maladies et les lésions Organiques du Cœur, &c.*, 4^{tr}ieme Classe, Art. iii., §. II., p. 303. Paris, 1818.

† *Die Krankheiten des Herzens systematisch bearbeitet und durch eigene Beobachtungen erläutert von D. Friedrich Ludwig Kreyzig.* Berlin, 1816. Zweiter Theil Zweite Abtheilung, S. 825.

‡ *Dissertatio Med. Inaug. Medica de Morbo coeruleo.* Lipsiae, 1813.

§ *De istis Cordis deformationibus quæ Sanguinem venosum cum arterioso misceri permittunt.* Gottingae, 1816.

|| *Observations et Recherches sur la Cyanose, ou Maladie Bleu; par E. Gintrac.* D. M., &c. Paris, 1824. 8vo.

case is recorded by Mr Howship; and in the third, which is one of those given by Dr Farre, the infant lived only five weeks.

Meanwhile, the subject had attracted the attention of M. Louis, who, in 1823, published in the Archives Generales de Medecine his views on the lesion, in a memoir on the communication of the right and left cavities of the heart. This author takes no notice of the dissertations either of Haase, of Hein, or of his countryman Gintrac; nor does he in the republication of his memoir in 1826 mention the existence of the monograph of the last author, though that had appeared two years previously,—in 1824. M. Louis distinguishes the different forms of the lesion into five varieties; 1st, communication of the auricles by means of the *foramen ovale* left patulous; 2d, communication of the ventricles by means of perforation of the septum; 3d, communication between the right and left cavities of the heart by means of the *ductus arteriosus* and the *foramen Botalli*, or by means of perforation of the septum of the ventricles; 4th, communication between the auricles and the ventricles by means of apertures in their partitions; and 5th, communication between the right and left cavities of the heart by means of the *foramen Botalli*, and by the aorta arising from the two ventricles.

In his subsequent general view of the pathological relations of the preternatural communication he attaches considerable importance to the different forms of contraction of the pulmonary artery. The origin of these he traces to different periods. Some, as those which are formed by a perforated diaphragm, he thinks must be congenital; others, however, he regards as of more recent formation; and he finally infers that it coincides in more than one-half of the cases with a very marked arctation of the pulmonary artery, which may be considered as congenital.*

From studying the more extensive set of cases afterwards collected by M. Gintrac, and comparing the histories of those contained in the writings of British physicians, with the appearances presented by the remarkable case recorded in the present paper, I have been led to draw conclusions regarding the pathological relations of the several lesions usually found in the case of communication of the right and left side of the heart, much more decided regarding the fact of contraction of the pulmonary artery, than are given, either by Kreysig, by Gintrac, or by Louis. I have been led to think that some degree or form of contraction, or arctation of the pulmonary is not only the first, but the most essential lesion; and that the open state of the foramen of Botallus, or the perforation of the ventricle, are to be regarded as dependent on this contraction, and, in a great measure, determined by this contraction having previously taken place to a degree, so great, as to

* Memoires ou Recherches Anatomico-Pathologiques. Par P. Ch. A. Louis, D.M., &c. Paris, 1826. P. 301.

render the free and natural circulation through the pulmonary artery impracticable.

There are three forms of lesion to which the pulmonary artery is liable; the first is a very unusually contracted formation of its cylinder; the second is complete obstruction of its interior; and the third is more or less occlusion of its interior by coalescence and mutual adhesion of its valves. From the cases hitherto recorded the two first lesions appear to be congenital; but it is not easy to say whether the third is congenital, or depends on some morbid process established soon after birth. In the spring of 1841, I met with an instance in which this lesion was found in a degree so remarkable that it seems difficult to understand how life was continued to the 19th year.

1. On the afternoon of Wednesday the 7th of April 1841, as I was quitting the Hospital about 5 P. M., I found at the inner gate a young man from the country with a face and lips almost purple, labouring under extreme breathlessness, and so enfeebled that he was quite unable to ascend the steps of the staircase. I requested my clerk to get him conveyed to bed; adding, that it was a case of communication of the right and left sides of the heart; and after the patient had a little recovered himself, the following facts were learned.

From infancy this young man, named Andrew Wauchope, had always been subject to shortness of breath, which was very urgent in cold, damp weather. The face, lips, hands, and nails had always been of a purple or livid colour, and though at some times this was less deep than at others, it never entirely disappeared. From his earliest remembrance he was subject to palpitation, or violent knocking action of the heart, which was aggravated to an extreme degree by corporeal exertion, or ascending an acclivity. During the last two years, also, he observed the feet and ankles to be occasionally swelled; but this symptom always subsided. It recurred some time ago, and was considerable at the time of admission.

Notwithstanding these complaints he continued to work at agricultural labour of a light nature, till about a week before the time of admission, when he was attacked with rather copious hemorrhage from the lungs, which took place unexpectedly while he was sitting beside the fire, without any corporeal exertion or mental excitement. The hemorrhage, he added, had recurred several times during the week, though he could not say how frequently, further than that it had sometimes occurred twice daily.

The purple colour of the face, lips, and nails continued; the tongue was of a livid purple colour at the tip, was elsewhere of a leaden tint, except in the centre, where its colour was obscured by a grayish fur of some thickness; the inside of the lips and cheeks were of an unusually deep-blue colour; and the vessels of

the conjunctiva were of a dark blue; the œdema of the feet and ankles continued.

The anterior part of the chest was very prominent, the sternum arched, and the shoulders much elevated. Respiration was twenty-eight in the minute performed by the accessory muscles, and with much labour. The sound of respiration was bronchial, blowing and limited, in some parts approaching to cavernous, with some dry sonorous and sibilous wheezing, but no moist rattles.

The cardiac region emitted, on percussion, a preternaturally dull sound; but above the third rib, on the left side, and on the right side of the sternum, the sound emitted was clear, and in some parts tympanitic. The cardiac beats were from 92 to 96 in the minute, performed with rather strong impulse, between the fourth and seventh ribs. The cardiac beats were heard also in the epigastric region, and on the right side of the sternum; and the first beat was performed with a rough, rasping, or sawing murmur, considerably prolonged.

At this time the diagnosis given was, communication between the right and left chambers of the heart, probably by the *foramen ovale*, hypertrophy of the right ventricle, and probable contraction of the pulmonary artery.

The only treatment consisted in the administration of some laxative medicine, in the observance of perfect rest, and the subsequent limited use of anodynes and antispasmodics.

In the course of four days the breathlessness was greatly abated, and the cough was less frequent and urgent; the colour of the face, lips, and hands was rather less deeply violet than at admission; but the vessels of the conjunctiva were still dark-coloured, and the nails had a deep blue tint. The œdema of the feet was diminished; the urine was increased; and the pulse was reduced to about 88, but still rose at intervals to 92 and 96. There was no return of hemorrhage.

At this time, when the beats of the heart were again examined, the pulsations were still heard most distinctly on the right side of the sternum; the first beat was still performed with the rough, rasping murmur, which was also heard most distinctly and forcibly on the right side of the sternum, immediately below the third and fourth rib, and obscuring there the sounds of respiration. The cardiac beats were also heard in the back, but much less forcibly.

From this time he continued much in the same state; except that when he attempted to rise and move about, the breathlessness was aggravated, and the cheeks and lips became unusually livid.

On the 10th of May, about four weeks after admission, he was attacked in the evening with rigors, followed by discharge of blood from the lungs. This soon stopped, and next day the expectoration only was streaked with blood. The impulse at the heart was strong and labouring, beats 96 in the minute, with the same rasp-

ing murmur, heard on the right side of the sternum, and with a very small pulse at the wrist. The face and lips were again livid; the surface was cold; and the patient was so feeble that it was impossible to examine the chest fully.

On the 14th the coldness of the surface was complained of by the patient himself, the face and extremities were livid, and the breathing became hurried, and progressively increased till the morning of the 15th May, when death took place.

Inspection of the body on the 17th May disclosed the following appearances in the internal organs.

Slight old adhesions were found connecting both pleuræ to the pulmonic pleuræ, mostly cellular, but increasing in firmness towards the convex and posterior part of the chest.

Two ounces of transparent straw-coloured serum were contained in the cavity of the pericardium.

The heart presented no traces of inflammation on its surface or in its substance, but was very much enlarged, especially in its right ventricle and auricle.

The right auricle was a good deal larger than usual; and the membrane forming the *fenestra ovalis* was thin and reticulated, presenting many minute holes; and at its lower *limbus*, close to the tricuspid valve, was a circular or rather elliptical hole, of the diameter of one-third of an inch, communicating directly with the left auricle.

The right ventricle, when cut open, was large in its capacity, and its walls were very much thickened, and considerably firmer than natural. At the apex of the ventricle was found a deposit partly of fibrinous blood, partly of decolorized fibrine, between the walls of the heart and the *columnæ carneæ*. The latter, viz. the fleshy pillars, were much larger and firmer than they usually are in the right ventricle.

The tricuspid valve was rather whiter and more opaque on its ventricular side than usual, but the aperture formed by it was not contracted.

The pulmonary artery was in its diameter much smaller than usual at its origin and connection with the basis of the right ventricle. Its origin was provided not with three distinct semilunar valves, as usual, but with a firm opaque membrane, concave towards the ventricle, convex towards the artery, so elevated into the interior of the artery as to form a truncated cone, with a small aperture in its centre and apex, not larger than to admit a common probe. This aperture was furnished round its margin with an elevated fringe, similar to the warty prominences usually found in diseased valves in general.

Upon examining the convex or arterial side of this membrane, three small membranous slips were observed passing between the membrane and the walls of the artery,—indicating the position of

the attachment of each valve, and at the same time showing that all of them were firmly united to each other. The sinus between two of these slips was deeper than that between the other two.

The weight of the heart was 18 ounces.

The left ventricle and auricle were of the natural size and capacity, and were otherwise healthy.

The apex of the left lung was firm and solid, and contained a cavity the size of a filbert. Several portions at the upper part of the lower lobe were solid, firm, and unusually dark-coloured. Some other small cavities were observed; but upon examining them carefully, they turned out to be dilated parts of the bronchial tubes.

The right kidney was very large, and weighed 9 ounces. Its different textures were pretty natural, excepting at one part, where corresponding to one of the tubular cones at its base, was a dark-coloured patch, in which the striated structure was much darker than usual, and rather obliterated. At another part opposite the base of one of the tubular cones, a similar change had taken place in the striated texture, the latter being much gone, and in its place was substituted a mottled red-coloured granular material.

The left kidney was shrunk and withered, so much as not to weigh more than one ounce and a-half, including the supra-renal capsule. All trace of its original cortical and tubular structure was entirely gone; and all that was left was the calycine membrane with one or two of the original infundibular holes.

The preparation is preserved in the College Museum.

Some time after, a case with similar obstruction at the valvular apparatus of the pulmonary artery, but much less complete, occurred in the practice of another physician to the Royal Infirmary. Here, however, the aperture in the centre of the membranous diaphragm was at least half-an inch in diameter.

2. Of this case the following detailed account has since been given me by our former prosecutor, Dr John Reid.

Thomas Shearer, aged 44; admitted on the 14th January 1841, under the care of Dr Graham, by whose permission it is here published.

He was a labourer on the Edinburgh and Glasgow Railway, and was sent from the country as labouring under fever, and was consequently first sent to a fever ward. Next day it was apparent that this was not the case, and he was sent to an ordinary ward; but the breathing was so laborious, and the man's strength was so much impaired, that he was unable to undergo minute examination of the chest.

He could not give any very distinct history of the progress of his disease, but he stated that, about six weeks before his admission, after a debauch of ten days' duration, he was seized with severe cough, which was at first dry, and afterwards attended with profuse expectoration; hoarseness, headach, and thirst superven-

ed, and he gradually lost flesh and strength. When admitted, his intellects appeared somewhat confused; he complained of frontal headach, and denied that he had any other local uneasiness; was very hoarse, and spoke very indistinctly, apparently from the very hurried state of his respiration; frequent cough, without any expectoration; pulse 120, weak; tongue thickly coated; face rather livid. Had twelve leeches to the chest and a blister.

After his admission, the respiration continued very frequent; about 60 in the minute. He was delirious and restless at night, and died on the 17th.

Sectio Cadaveris, 21st.—Chest.—The left lung appeared somewhat contracted in size, and the inner surfaces of the left pleura were very firmly adherent; a very large tubercular cavity in the apex of left lung, occupying nearly the whole of the upper lobe; several large bronchial tubes opened into this cavity; the rest of the left lung was dense, from the deposition of yellow tubercles, some of which had broken down, forming small *comicæ*.

The right lung was voluminous; but the posterior and middle parts of the upper lobe, the posterior part of the middle lobe, and the upper and back portions of the lower lobe, were dense from the deposition of yellow tubercles, and from intercurrent pneumonia. Some of these tubercles were also in the course of breaking down.

The left margin of the outer surface of the pericardium adhered firmly to the costal pleura of the left side.

The heart was increased in size, weighing 13 ounces 2 drachms.

On opening the pericardium, the pulmonary artery and aorta were seen to be much distended, and they gave the sensation to the finger of being full of air. On opening them, a quantity of gas escaped, and also a quantity of frothy blood, with dark-coloured clots floating in it. [This is doubtful to Dr Graham.]

The outer surface of the right auricle, especially the appendix, was covered with a thin layer of firm reticulated lymph, evidently the result of some former inflammation, probably of ancient date. The right auricle was much dilated, and, at the same time, decidedly thicker and firmer than usual. The right ventricle was much hypertrophied, being nearly equal to the usual thickness of the left ventricle, and its cavity was, at the same time, smaller. The tricuspid valve was thickened at some parts, and presented some slight elevations on the inner surface of its lips.

The pulmonary semilunar valves were much thickened, and were so united at their adjacent edges as to form a ring, which could only admit the point of the little finger. This appearance of a ring was only seen on looking downwards from the pulmonary artery, and probably would remain nearly of the same size both during the systole and diastole of the ventricle. The pulmonary artery was much dilated, and its coats attenuated.

The left cavities appeared healthy.

The aortic semilunar valves were somewhat thickened, but were

adequate. The aorta was also dilated at its arch, but not to the same extent as the pulmonary artery; and a number of small yellowish elevations were scattered over its inner surface.

Some small elevations of a pale yellow colour were observed in the site of the elliptical patches at the lower part of the ileum; other abdominal viscera healthy. No gaseous fluid found in any other organ where it does not naturally exist, except in the heart. No appearance of incipient putrefaction anywhere.

Instances, in all respects similar to the lesion now described, and proceeding to the same degree, are rare. Those described by Gintrac are either examples of the narrow formation of the pulmonary artery, or of its termination in a *cul de sac*.

Of the cases most nearly approaching to it one is recorded by Tacconi, in the Bologna Transactions, and another is delineated by Cruveilhier in the 28th number of his Pathological Anatomy, and very briefly described by him.

The case by Tacconi is to the following effect:—

3. A young woman, about the age of 15, was in the practice of moving so slowly that she was obliged to stop every third step. The hands, nails, face, lips, and white of the eyes were remarkably purple. During winter, and when the wind was in the north, she always felt herself upon the point of death. In this state she continued three years from the time when she was first seen by Tacconi, and at length the debility increasing to an extreme degree, and the voice failing, she expired in her 18th year.

Upon inspecting the body the following day, the lungs were found shrunk, with little fluid, and of a very dark colour. About three ounces of viscid dark-coloured blood were scattered over the diaphragm. The heart was of a cubical shape. The left ventricle had the shape of the right; and the right that of the left, being furnished with strong muscular columns. The pulmonary artery was so closed by the mutual adhesion of its three sigmoid valves, that water injected flowed through it only by a very small hole made by a probe previously introduced. The *canalis arteriosus* was closed. But the *foramen ovale*, especially on the side of the right ventricle, was much larger than it is in the fœtus.*

4. In the case given by Cruveilhier, [I use his own words to obviate mis-statement,] “the orifice of the pulmonary artery is singularly narrowed by a species of diaphragm perforated in its centre by a regularly circular aperture about the size of a lentile. This diaphragm, convex at the arterial or upper surface, and concave at the lower or ventricular surface, presents in the former direction three bridles or slips separated by the same number of hollows or sinuses.

“This diaphragm represents the sigmoid valves, and is evidently formed at the expense of these valves.”

* De Bononiensi scientiarum atque artium Instituto atque Academia, Tom. vi. p. 64.

The right ventricle was in this case also hypertrophied, with hypertrophy of the fleshy pillars. But no mention is made of the state of the *foramen ovale* or the *septum cordis*, excepting that the latter was less hypertrophied than the rest of the ventricle. The former was evidently closed.

The principal point of interest in this case is the date of the origin of this peculiar lesion. Was it a congenital malformation, or did it take place some time after birth?

This question it is almost impossible to determine from one case; but various circumstances in the case of Wauchope, and especially the patent condition of the *foramen ovale*, are in favour of its congenital origin, or at least its appearance soon after birth. Cruveilhier allows that the first idea which the appearance of the diaphragm suggests is, that the structure is congenital; and he admits that it is the idea which all the analogous facts collected by other observers have suggested. He adds that it is impossible to admit a congenital lesion of this kind in individuals who have presented symptoms only a short time before death; but allows that where the *foramen ovale* is open, that forms a strong ground for believing that the lesion was congenital.

These considerations, it must be remarked, are all in favour of the inference that this lesion was congenital, or at least originated very soon after birth. The blueness of the face and lips had been observed from the very first; the violent action of the heart had also been an early symptom; and the patient had been subject to short and difficult breathing from infancy. An aperture of considerable size was found establishing a direct and free communication between the right and left auricle; and the membranous diaphragm itself was so firm and complete, that it appeared scarcely possible to believe that it could have been of recent formation.

I have only one other observation to offer on this and similar cases. It has been usually supposed that the open state of the *foramen ovale*, whether direct or oblique, is a primary lesion of the heart, and is pernicious to the patient, in allowing the free intermixture of the blood of the right chambers of the heart with that of the left. Within certain limits this idea is well-founded; and in a certain number of cases, the open state of the *foramen ovale* tends to impede nutrition and to abridge the duration of life. I am, nevertheless, satisfied, both from the facts of the case now related, and several others, of three circumstances; *first*, that the open state of the *foramen ovale* is rarely a primary and solitary lesion; *secondly*, that when it is a solitary lesion it is not injurious, and the venous blood of the right auricle is not thereby necessarily mixed with the arterial blood of the left auricle; and *thirdly*, that, in opposition to what has been hitherto usually taught, the open state of the *foramen ovale* is in a large proportion of cases the means of prolonging life.

It is unnecessary for me to enter into any formal defence of the

latter conclusion, which, however paradoxical it may seem, and however opposed to the usually received dogmas, flows almost directly from the facts which may be traced in every case of open *foramen ovale*. That, in short, is not the primary lesion. From the phenomena of the cases recorded, on the contrary, and from the frequency of the arctated or contracted state of the pulmonary artery, it must be inferred that the obstructed state of that artery is the primary lesion, and determines not only the open state of the *foramen ovale*, but the hypertrophy of the right ventricle. This is the result, whether the pulmonary artery is only greatly narrowed in calibre, or terminates in a *cul de sac*, or is obstructed by a membranous partition formed by the coalition of the semilunar valves.

The effect of such an impediment is manifest. The blood cannot pass into the pulmonary artery with the requisite freedom and facility. The result is over-distension, *first* of the right ventricle, and excessive labour of its muscular apparatus; *secondly*, of the right auricle, and excessive labour of its muscular apparatus, with extreme dilatation of its membranous portion; *thirdly*, over-distension and congestion of the whole venous system all over the body. The lungs, meanwhile, receive little or no blood, and, consequently, the blood is not duly aerated or supplied with oxygen, and cleared of carbon and carbonic acid. This is doubtless an evil and a great one. But Bichat has obscurely suggested, and Dr Williams and Dr Kay have clearly shown, that dark-coloured blood, or that which is venous is adequate to maintain vital action. It is, indeed, a less evil, and more tolerable than total obstruction in any of the large vessels, and especially in a vessel like the pulmonary artery. Every thing that we now know of these cases shows that the obstruction to the circulation through the pulmonary artery must be the main cause of the short and transitory existence of persons labouring under this severe lesion; and that the open state of the *foramen ovale*, instead of being, as William Hunter and other authors imagined, a cause of death, furnishes the only means by which life can be prolonged, while a function so important as that of the circulation through the lungs is impeded.

I am further entitled to infer from various facts in the history of the development of the ovum, that the obstructed, or, it may be, the undeveloped state of the pulmonary artery, is the anatomical cause of the perforated septum, and of the origin of the aorta from the two ventricles when that malformation is observed.

It would lead to some curious and interesting results to inquire by what means the impeded function of the lungs is in these cases compensated; for that it is compensated by the action of the skin and other membranes, can scarcely be doubted. But this would lead me into a field too extensive for consideration at the present time.

ART. II.—*Cases of Dissecting Aneurism, or that form of Aneurismal Affection in which the Sac is situated between the Coats of the Vessel.* By THOMAS BEVILL PEACOCK, M. D., Pathologist to the Royal Infirmary, one of the Presidents of the Royal Medical Society.*

THE term Dissecting Aneurism was first employed by Laennec,† and it would appear that he regarded the case which he has quoted as the first which had been recorded. Mr Allan Burns has, however, related a well marked example of the affection in his work on Diseases of the Heart, published in 1809; and two others are described by Mr Shekelton,‡ in the Dublin Hospital Reports for 1822. Cases of the affection in an early stage are also related by Morgagni,§ and by Dr Nicholl in his account of the examination of the body of George II.||

More recently, two cases of the disease have been given by Mr Guthrie in his Lectures on the Diseases and Injuries of Arteries, one by Dr Elliotson in his Lumleyan Lectures, two by Drs Pennock and Goddard in the American Journal of Medical Sciences,¶ two by Mr Smith in the Dublin Journal;** and one figured in the fourth fasciculus of plates published by the army medical department, is also described by Dr M'Lauchlan in the Glasgow Medical Journal.†† In addition to those, two cases of the disease recently fell under my notice in the Royal Infirmary; and I have had the opportunity of examining a third which occurred in the practice of Dr Paterson of Leith. Two preparations of the disease I have found in the Museum of the College of Surgeons, and one in the Hunterian Collection of the Royal College of Surgeons of London; and still more recently, an interesting example has been quoted from an Italian Journal in the Gazette Medicale de Paris.‡‡ In the following paper, after describing the particulars of five of the cases not hitherto reported, I shall offer as full an analysis of the whole of the nineteen cases as the data will allow.

The Dissecting Aneurism differs very greatly from the more com-

* This paper forms the substance of an essay read before the Royal Medical Society in November 1842.

† *Traite de l'Auscultation*, 1826, Tome ii. pp. 696. This case was related by M. Ambroise Laennec to the Society of the Faculty of Medicine at Paris.

‡ Dublin Hospital Reports, Vol. iii. p. 231.

§ *De Sedibus et Causis Morborum*, Ep. xxvi. § 15, 17, 21, Ep. xxvii. § 28; and Alexander's Translation, Vol. i. pp. 803-6, 861.

|| Philosophical Transactions, 1761.

¶ Quoted in the London Medical Gazette, Vol. xxiii. p. 668.

** Dublin Journal of Medical Sciences, Vol. ix. p. 426. Contributions to Pathological Anatomy, by R. W. Smith. Reference is made to a third case, the preparation of which is contained in the Museum of the Richmond Hospital.

†† Vol. i. p. 1, 1833.

‡‡ Tome x. p. 624, August 1842. Case of M. Tessier, extracted from the *Giornale delle Scienze Mediche*.

mon forms of aneurismal affection. In the latter, whether resulting from dilatation of the arterial tunics, or from rupture or ulceration of the internal and middle coats, the sac forms a distinct and more or less round tumour projecting from the side of the vessel, with the canal of which it communicates by a comparatively small aperture, and the disease, though fatal, is slow in its progress, and gives rise from the pressure of the tumour on the adjacent vital organs, to very characteristic symptoms. In the dissecting aneurism, on the contrary, the sac occupies the walls of the vessel, and following its course, resembles only a dilated artery; the aperture by which the two canals communicate is usually a long and narrow fissure; the disease is suddenly developed, and usually rapid in its progress to a fatal termination; nor are the symptoms which attend its formation and progress such as can be regarded as characteristic of the affection. The disease usually originates in laceration of the internal and a part or the whole of the middle tunic of the artery, more rarely in the perforation of the coats from other causes, and as they have not acquired that intimate adhesion together which obtains in cases of circumscribed aneurism, or are rendered more readily separable by active disease, the blood insinuates itself into the cellular space between the external and middle coats, or more probably between the layers of the latter, and effects their separation. An aneurismal sac is thus produced, following the course of the artery to a greater or less extent both above and below the internal fissure, bounded externally by the external coat, with probably in most, if not all cases, a portion of the middle, and separated from the original canal by a septum composed of the internal membrane of the artery, and a part or the whole of its middle tunic.

When a case of the disease is examined at a remote period, the ragged aperture by which the sac communicates with the vessel, and the roughness and irregularity throughout its course, at once point out its nature. In a later stage however, the edges of the fissure become clean and equal, the sac acquires a lining membrane of a yellowish colour and possessing the smoothness of the serous lining of a healthy artery; the branches passing to the adjacent parts are observed, some to take their origin from the new canal, others from the original vessel; and the whole resembles rather an uncommon conformation of the artery than the effects of disease,—a resemblance which becomes the more striking, when, as occasionally happens, the sac after proceeding a greater or less distance, reopens into the canal from which it originated. Mr Shekelton, in speaking of the cases which fell under his notice, says on examination “of the first case, I was at a loss to explain it, so little did the tumour resemble an aneurismal sac, and so similar was its situation to that of the artery, that I was rather inclined to regard it as an uncommon *lusus*. In the second, however, the doubt was

cleared up, for the aneurismal sac had not undergone that revolution in its structure which might have given rise to such a mistake; and lastly, a similar aneurism having commenced in another part of the artery, afforded some explanation of the progress of the disease."^{*}

The accumulation of instances of the disease in its several stages from the earliest, in which it only appears as a rupture of the internal coats with an ecchymosis beneath the external, to the state in which it forms an entirely new canal, has now removed all difficulty in recognizing the affection. I shall proceed to describe the cases which I have found hitherto unpublished, offering such additional illustration from those already recorded as the description of the disease may seem to require.

The first case is one for which I am indebted to Dr Paterson of Leith, and the preparation of which is in my possession.

CASE 1.—*Dissecting aneurism originating in a transverse laceration of the internal and middle coats of the aorta, one inch above the semilunar valves. Death from rupture of the sac into the pericardium.*

The patient, a female 56 years of age, was of somewhat intemperate habits, and had suffered for some time from asthma. She retired to bed in her usual health, and was found dead the following morning.

On examination, the pericardium was greatly distended with blood, and a laceration by which it had escaped was found on the anterior surface of the aorta. On opening that vessel from behind, the internal and middle coats displayed a transverse fissure, crossing the upper part of the external longitudinal opening; and between the two, the coats were separated to a considerable extent, both above and below. The following notes are taken from examination of the preparation: The external fissure is eight lines in length, and is situated somewhat to the right side of the vessel, and follows a longitudinal direction, its lower extremity being half-an-inch above the origin of the aorta. Its edges are clean and regular, presenting the appearance of an incision. The internal rupture is, on the contrary, transverse, and is situated one inch above the aortic semilunar valves, and is two inches in length—scarcely one-third of the circumference of the vessel being still entire. Its edges are ragged and uneven, the internal coats not having throughout given way at the same point. The separation between the coats extends upwards for about one inch, forming however, only a narrow channel in the front of the vessel; downwards it reaches an inch and a-half, and extends over a much wider portion, passing behind the semilunar valves and in the space at the base of the heart where the *septum ventriculorum* is formed by the fibrous tissue and lining membranes of the ventricles, so that the

* Dublin Hospital Reports, Vol. iii.

sac is here separated only by these membranes from their respective cavities. When recent, the lower portion of the sac contained several tolerably firm coagula. The ascending aorta is dilated to fully twice its natural size, and its walls are of very unequal thickness, and display several smaller and somewhat sacculated expansions—in some of these the coats being so thin as to be semitransparent and to consist of little else than the external and internal tunics. Atheromatous deposit is copiously infiltrated beneath the lining membrane throughout the course of the thoracic aorta, and near its origin has in several places undergone the ossific degeneration, while in others the lining membrane is abraded or so soft as to be readily removed. The vessels arising from the arch are larger than usual, more especially the *arteria innominata*. Where the thinning of the coats does not exist, they are on the contrary, thicker than usual, and covered externally by false membrane, producing adhesions between the reflected and attached pericardium. The aortic valves are sound; the mitral opaque and a little thickened. The cavity of the left ventricle is large, and its walls somewhat thinned; at the apex there exists a very distinct dilatation, so as to form a small cavity, which is separated from the fat there deposited by an extremely thin layer of muscular fibre. The right cavities of the heart are both very greatly dilated. On minute examination of the parts forming the aneurismal sac, it was found to be situated, not between the external and middle coats, but between the laminæ of the latter, the largest portion of the fibrous tunic being, however, still attached to the lining membrane, and so forming the posterior wall of the sac, while a thin lamella was separated along with the cellular tunic and assisted in forming its external covering.* The preparation in this case most closely resembles that figured in the army plates.

The next case is very similar to that which has just been related. The preparation is contained in the Hunterian collection of the Royal College of Surgeons of London. Of this I regret the only information I was able to procure was contained in the reference to the preparation in the catalogue as a case of "Rupture of the Aorta."†

CASE 2.—*Dissecting aneurism of the ascending aorta, originating in a transverse fissure of the internal coats, and terminating by hæmorrhage into the pericardium.*

The canal of the aorta in this preparation is considerably dilated,—the dilatation commencing somewhat abruptly about an inch above the aortic valves, and terminating at the point at which the

* Several writers have fallen into the error of describing the origin of the aorta as not passing the cellular coat. This tunic, though thin, is firm and resistant on the portion of the aorta covered by the pericardium, but becomes much more distinct towards the arch.

† This case is described by Mr Guthrie in his *Lectures*, &c.

left subclavian artery is given off; the dilatation is greatest in the ascending portion of the arch, and involves also the origins of the large arteries passing to the upper extremities and head—the brachio-cephalic trunk and the left carotid being especially affected. The coats of the artery over this space are thickened, and the internal is slightly marked with atheromatous patches throughout the course of the vessel. The rupture in the internal and middle coats is situated about two inches above the aortic valves at the concavity of the arch, and is about one inch in length; its direction is at first from above obliquely downwards and then transversely. The separation between the coats occupies a space of about two inches in diameter on the right side of the vessel, and bounded laterally by the attachment of the pulmonary artery. The fissure in the external coat of the artery by which the blood must have escaped into the pericardium, is in length one inch, its lower extremity being about half-an inch from the origin of the aorta; its direction is longitudinal, the transverse division of the internal coats crossing its upper extremity. The edges of the internal fissure are smooth and regular, those of the external ragged and torn. The heart is not retained with the preparation, but the aortic valves, with the exception of displaying small vegetations at their free margins, are healthy. The dilatation of the aorta where at its greatest, is about twice the ordinary diameter of the vessel. It is not throughout equal, several small and slightly sacculated portions existing in the transverse arch.

These cases afford the earliest examples of the disease which I have had the opportunity of examining, and they are of a similar description to several of those which have been recorded, and which are referred to (3, 4, 5, and 6,) in the appendix. It is to be regretted that no history could be obtained of the last case, though the small size of the aneurismal sac and the appearances of the ruptures render it probable that, as in the first case, death must have followed almost instantaneously upon the internal rupture, from the escape of the blood into the pericardium.

An earlier stage of the disease has in several instances been found on dissection. Morgagni* has related the case of a nobleman, 59 years of age, who died suddenly, and in whom the aorta “was first ruptured at the distance of about a finger’s-breadth from the heart. Yet this rupture was not large; but near to it and round all the basis of the aorta, a kind of blackness, as if from an old bruise appeared, which was owing to black blood stagnating under the external coat; and this blackness extended itself throughout the lungs in general, but particularly about the branches of the pulmonary artery.” The pericardium was distended with blood.

* De Sedibus et Causis Morborum, xxvii. § 20.

Dr Nicholl in his account of the examination of the body of George II., published in the Philosophical Transactions for 1762, after describing the rupture of the right ventricle, which had occasioned death, says, "In the trunk of the aorta we found a transverse fissure in its inner side, about one inch and a-half long, through which some blood had recently passed under its external coat and formed an elevated ecchymosis." A similar appearance is described by Mr Hodgson,* as occurring in the case of a lady who died suddenly from rupture of the apex of the left ventricle. "The aorta of a lady illustrated this stage of the formation of an aneurism. The internal coat was throughout converted into cartilage, and covered with calcareous deposition. At the arch of the aorta there was a transverse slit about an inch in length, which had penetrated also the middle coat; the blood had insinuated itself between the external and middle coats, the former of which was raised into a tumour about two inches in circumference, and presented the appearance of a circumscribed ecchymosis." Mr Hodgson quotes this appearance as probably the earliest stage in the formation of a circumscribed aneurism as described by Scarpa, while however, it is possible that the process of dissection here begun might have been arrested by the effusion of lymph around the edges of the fissure, it is fully as probable that, had the patient survived, it would have gone on to the formation of a dissecting aneurism.

In the following case the dissecting process was somewhat more extensive than in the two formerly given. The disease was however, probably of equally recent formation.

CASE 8.—*Dissecting aneurism, the sac of which extended from the origin of the aorta to the commencement of its abdominal portion. Two ruptures of the internal coats situated in the transverse arch. Death from escape of blood into the pericardium.*

Janet Jopp, aged 84, left her house, situated in the High School Wynd, on the morning of the 12th of January 1842, with the intention of going into Nicolson Street. When opposite to the Infirmary she was observed to sit down on the steps, and almost immediately fell forwards; and on being carried into the Infirmary, she was found to have expired. It appeared on inquiry of her friends, that, with the exception of having a year and a half before laboured for a short time under a dropsical affection, she had suffered from no serious illness, and was in her usual health up to the time of her leaving the house.

The body was examined in the presence of Dr Craigie the following day. The brain was found healthy; between 11 and 12 drachms of serous fluid were removed from the lateral ventricles, and a considerable amount was contained in the base of the skull.

* Diseases of the Arteries and Veins, p. 63.

The veins of the neck and chest were greatly engorged with dark fluid blood. The cavity of the pericardium was distended with bloody serum, and contained a considerable quantity of coagula, and on these being removed the membrane covering the aorta and pulmonary artery was found elevated by extravasated blood, and, on the surface of the former, there existed a superficial fissure, having a longitudinal direction through which the blood could be made to exude on pressure. On the heart and lungs being removed from the body, a separation of the coats of the aorta was found to have occurred, extending from its origin to the commencement of the abdominal portion of the vessel. On slitting up the outer coat a rupture was detected, situated three-quarters of an inch behind the origin of the left subclavian artery, and extending transversely through the two internal coats of the vessel for nearly its whole circumference; the edges of this fissure were ragged and irregular, and the laminae of the middle coat were somewhat separated. Two inches anterior to this rupture, and one-third of an inch below the origin of the *arteria innominata*, there existed a second on the anterior aspect of the vessel; this was nearly an inch in length, its course following that of the artery, so that it crossed the fibres of the middle coat; its edges were widely separated and more regular than those of the transverse fissure. From these points the blood had effected a separation between the coats upwards to the heart, and downwards to the commencement of the abdominal aorta. Beneath the pericardium the separation was not entire, the blood having been infiltrated into the cellular tissue without breaking down its attachments, so that a probe could not be made to protrude through the fissure in the pericardium, though the blood transuded on pressure. Some blood had also escaped at the posterior part of the arch and into the right lung, but without any distinct rupture being traceable. Some loose coagula were contained in the sac at the ascending portion of the arch. At the commencement of the aorta the separation between the coats forming the sac involved nearly three-fourths of the circumference of the vessel; at the transverse portion it was more confined, being bounded by the large arteries proceeding to the head and upper extremities, but below the left subclavian and near the posterior rupture, the coats were detached around nearly the whole circle of the vessel; beneath this point the canal became narrower, and ceased where the vessel passed between the crura of the diaphragm. The external coat of the *arteria innominata* was separated over its whole circumference, as was also that of the right carotid, and, for a short distance, the left subclavian. The intercostal arteries on each side opened into the aneurismal sac, and the internal coats presented

small apertures corresponding to their origins, forming communications between the original and newly-formed canal. The ascending portion of the aorta was somewhat dilated. Its coats thinner than usual, and the lining membrane elevated by atheromatous deposit in the form of small yellowish-coloured masses; no roughness or ulceration was anywhere detected. The coats of the vessel were evidently recently torn asunder, and the separation had taken place, as in the former case, not in the cellular tissue, between the external and middle coats, but between the laminae of the latter, a very thin layer of the middle tunic remaining attached to the external coat. The heart was of its usual size, much loaded with fat and flaccid; the walls of the left ventricle were thicker, and its cavity smaller than usual, probably from the mode in which death had taken place; the valves were healthy. The lungs were healthy, but attached by slight cellular adhesions to the parietes of the chest, and were unusually mottled with black pulmonary matter. The right contained some extravasated blood. The abdominal organs were natural, but the kidneys and spleen small in size. The uterus contained several hard masses about the size of peas imbedded in its substance.

The cases in the appendix marked 7, 9, 10, and 11 were very similar to that last related. In the second, however, death occurred from a rupture of all the coats of the *arteria innominata*. In the 3d, a distinct opening formed from the sac into the cavity of the pericardium, and the last proved fatal by rupture of the right auricle.

A case of rupture of the aorta, related by Mr Rose,* in the Medical and Physical Journal, I conceive to have been very similar to several of these. The internal fissure occurred at the commencement of the transverse portion of the arch of the aorta. The blood first passed beneath the fibrous coat and pericardium, and burst by a small rupture through that membrane; the internal rupture still, however, continuing to give passage to the blood, the corresponding external coat at length gave way, and the blood escaped into the mediastinum, and then into the pleural sacs. Had the patient survived the escape of the blood into the pericardium in case eighth, hemorrhage would probably have taken place into the lungs more extensively.

The cases which have now been related were all of recent origin,—others are, however, recorded, in which the disease had been of long standing, and in which the aneurismal sac formed a canal external to that of the artery, lined by a distinct membrane, and communicating with the original canal by smooth and regular openings. Such is the case detailed by Laennec (15) in which the sac was situated in the abdominal aorta; or still more remarkably

* London Medical and Physical Journal, Vol. lviii. 1827, p. 15

the case related by Dr Pennock in the American Journal of Medical Sciences. In this case, marked No. 18, the fissure occurred half-an inch above the semilunar valves, and the sac, which was situated in the laminæ of the middle coat, extended thence to the bifurcation of the aorta. More recently a case has occurred in the practice of the Royal Infirmary, of which an abstract is marked 19 in the appendix; in this the sac commenced by a longitudinal fissure behind the origin of the left subclavian artery, and extended to the bifurcation of the aorta, forming a second communication, probably of some standing, with the left common iliac artery. In this instance, also, I satisfied myself that the internal rupture did not penetrate the whole thickness of the middle coat, and that the sac was found within its laminæ. As, however, this case will be reported by Professor Henderson, in whose practice it occurred, I forbear further allusion to it.* This case, it will be observed, bears very close resemblance to those of Mr Shekelton, 16 and 17. In the first of these the tumour originated about three inches above the bifurcation of the aorta, and reopened by two apertures into the two common iliac arteries. In the second the aneurism arose from the aorta along with the left common iliac artery, and opened by two apertures into the corresponding external iliac.

The above cases constitute all those which I conceive to have originated in lacerations of the internal coats; and it is doubtful whether, in one at least of Mr Shekelton's cases, the disease may not rather have originated in an extension of the internal coat of the vessel, between the middle and external tunics. The remaining cases there is reason to regard as having had a different origin. These cases are those, the preparations of which are contained in the Museum of the College of Surgeons of Edinburgh, and I am indebted to the curators of the college for permission to publish a description of them. Unfortunately there exists no other history of the cases, than the very meagre notice contained in the museum catalogue.

CASE 12.—*Dissecting aneurism of the ascending aorta, the result of ulcerative perforation of the internal coats of the artery, immediately above the semilunar valves. Death from rupture into the pericardium.*

This preparation is marked 1144 in the museum catalogue of pathological preparations. The ascending portion of the aorta is dilated to fully twice its natural size,—the dilatation occupying chiefly the convexity of the arch, and terminating at the origin of the *arteria innominata*. The external coat of the vessel is covered with layers of lymph, and the internal is thickened, and much corrugated, containing also much deposit in the subjacent cellular tis-

* Since this was written Dr Henderson has published an account of this case, with remarks on the formation of dissecting aneurisms in the London and Edin. Med. Journal for July 1843.

sue. About half-an inch above the semilunar valves, the lining membrane is entirely denuded over a space larger in size than that of a sixpence, and from this a probe can be passed obliquely into the sac of the aneurism, which is situated at the anterior portion of the arch, and between the middle and external coats. The length of the sac is about two inches, and the breadth one inch and a-half; its external wall is thick and rough from layers of lymph; at the inferior part of the sac an opening, large enough to admit a writing quill, communicates with the cavity of the pericardium.

CASE 13.—*Dissecting aneurism originating in an ulcerated aperture near the origin of the left subclavian artery. Death is stated to have resulted from the obstructed state of the circulation. This preparation is marked 1145.*

The ascending portion of the aorta is considerably dilated, and its inner coat extremely irregular from the yellowish masses deposited in the subserous cellular tissue. These, though firm, have not undergone ossification. Behind the left subclavian artery there is a regular oval-shaped aperture about the size of the little-finger nail, which leads into the aneurismal sac. This is situated beneath the external coat of the vessel, and extends along its anterior portion from the left subclavian artery to the heart, surrounding about two-thirds of the circumference of the vessel. The whole of the coats of the artery are unusually thick and the external, where it covers the sac, especially so. The sac contains layers of coagula, some of which appear to have been decolorized, and these have partially obstructed the aperture by which it communicates with the original trunk. The separation of the coats has apparently also advanced along the *arteria innominata*.

It would have been a matter of much interest to have ascertained the history of these cases, since they bear so slight a resemblance to the others, as to point strongly to another mode of formation. In the catalogue both are stated to have originated in rupture of the internal coats. I am, however much inclined to doubt the correctness of this, and to regard them as having resulted from ulceration. The apertures are such as would scarcely be formed by fissures, and the diseased state of the lining membrane, and the great thickening of the coats, with the lymph effused on the external walls of the sacs, show that active inflammatory action must have been present, either prior or subsequent to the occurrence of the perforations. In this form of the affection the series of the cases is not so complete as in that resulting from rupture,—an appearance found by Morgagni* in the body of a man who died suddenly at the age of 60. I am, however, inclined to regard as indicating an early stage of the affection. “ From the same surface, not a great distance from the

* De Sedibus et Causis Morborum, Ep. xxvi. § 15.

heart, a foramen, big enough to admit a finger, took its origin, and going through the coats in an oblique course of almost four finger's breadth, from below upwards, it at length opened on the external surface of the artery within the pericardium." And again, in a female who died of an aneurism of the aorta, he found "a kind of ulceration about two inches above the semilunar valves, and in that ulceration were three or four very deep foramina very near to each other, each of them about the bigness of a lentil, but of an angular form rather than round. From these foramina winding sinuses were carried obliquely outwards, and reached to the external lamina of the aorta, which was in that place, therefore, of a brownish colour mixed with red, as if in consequence of inflammation, and became much thickened by a great flow of moisture. And in the middle of that redness, the lamina being at length lacerated, the blood had made a way for itself into the pericardium by a foramen similar to the internal foramina, and almost of the same magnitude."*

Mode of Formation.—Few pathologists will probably be found at the present time to adopt the exclusive views of Scarpa, that aneurismal tumours always arise from rupture of the internal and middle coats, or, as he terms them, the "proper coats" of the artery, and it is probable that, had he frequently examined specimens of the disease in an early stage, instead of tumours of large size, his opinions would have been much modified, since it is granted that, however the disease originates, the continuity of the internal and middle coats of the artery throughout the walls of the sac can only be traced in small aneurismal tumours; and sufficient evidence has been adduced by different observers to show that, while the disease is occasionally traceable, both to rupture and dilatation of the coats, the latter is at least in the upper portion of the aorta the most frequent mode of origin. The examination of several recent specimens of aneurismal disease in different stages of progress, and of numerous diseased arteries, has led me to suspect that the two forms of aneurism are traceable to diseased changes in the coats, which, though often found more or less co-existent, are of very different descriptions, and which produced results varying greatly according to the preponderating change. In the one, that form to which the terms atheroma or steatoma has been applied, and the nature of which has recently been illustrated by Mr Gulliver, a yellowish granular matter is deposited in the lining membrane of the artery, or in the cellular tissue beneath it, and occasionally invades the middle coat. This undergoes a gradual process of softening; the lining membrane gives way; the middle coat is also perforated or atrophied, and the tunics around the diseased portion become firmly adherent, and thus, while the

* Ep. xxvi. § 21.

current of the blood is sustained by the outer coat, which, however, must be conceived to have been strengthened by the exudation of lymph, the separation of the coats, and the diffusion of the blood between them is prevented, and a circumscribed aneurism is produced, according to the views of Scarpa. The other change, or that which I conceive leads to the formation of the aneurisms by dilatation, has not attracted so much attention. In this instance the disease, though not confined to that tunic, involves chiefly the middle coat. This membrane loses its yellow colour, becomes semitransparent, and of a harder consistence than usual, acquiring the appearance of the hyaline or cartilaginous tissue. Its fibrous texture also is less distinct, and in this respect the contrast between the healthy and diseased coats is rendered more apparent on microscopic examination. The middle tunic also becomes, as described by Dr Davy,* much thinner than usual, and in places where the dilatation is great, can often not be traced. While these changes are in progress, the several coats become more intimately adherent together, and on dissecting an artery in this state, the tunics, which in the healthy portions are readily separable from each other, can rarely be traced in the diseased parts, the middle coat usually splitting and remaining attached partly to the external, partly to the internal coat. With this affection of the fibrous coat, there is usually combined some degree of atheromatous disease and thickening of the inner membrane. In each form of disease, however, the changes are either preceded or attended by the morbid adhesion described, and I have uniformly found it present in such recent specimens as I have examined, and this too in some in which the dilatation of the coats was very slight; and it seems to form an important step in the development of the sacculated aneurismal tumours. It appears, however, to have been overlooked by Scarpa, who, though he regarded the rupture of the internal tunics as resulting from "a slow change," and described them as becoming intimately adherent, yet appears to have considered that this change did not extend to the external coat. Burns, however, in his strictures on views of Scarpa, has remarked, that "the rupture of the internal coats of an artery is not the first part of the process which takes place in the production of an aneurism. Before this happens we find that the external coat has all around the diseased part of the proper coats of the vessel been fixed to the healthy coats more firmly than usual. When, therefore, by the *vis-a-tergo*, they burst at the weakest point, the blood insinuates itself between the external and the middle coats, it detaches the former from the latter as far as the disease of the internal coats extends. Beyond this it cannot separate them, the adhesion having there become preternaturally firm."† In the above passage, Mr Burns has, I con-

* *Researches, Physiological and Anatomical*, Vol. i. p. 372.

† *Diseases of the Heart*, p. 215.

ceive, correctly described the mode of origin of the sacculated aneurisms from rupture of the internal coats; and in his report of a case of dissecting aneurism, he has described the firm band of adhesion by which the extension of the sac between the coats was limited.* Without it, he has justly observed, that the blood would freely insinuate itself between the coats separating them extensively from each other, instead of producing, as supposed by Scarpa, a circumscribed tumour. It is, indeed, to the sudden occurrence of a rupture of the internal, and a part or the whole of the middle coats of an artery, the tunics of which have not previously become adherent, that the origin of the dissecting aneurism has usually been ascribed, and it is a view which readily explains all the features of the disease; while the infrequency of the dissecting as compared with the circumscribed forms of aneurism, may be referred to the rare occurrence of disease of the coats, sufficient to produce their rupture or ulceration unattended by adhesion of the tunics together. To this view of the mode of origin of the dissecting aneurisms, it has, however, been objected by the editor of the *Gazette Medicale*† in his account of the case of M. Tessier, that the adhesion of the coats of the artery which is supposed to precede the formation of sacculated aneurisms by rupture, so far from being a constant is a rare occurrence; and more recently by Dr Henderson,‡ that the supposition of such adhesion is not necessary to explain the formation of sacculated aneurisms from rupture of the coats, since no such result as the diffusion of fluids in the course of the vessel attends their injection after death into arteries of which the internal coats have been ruptured. To obviate the former objection, I may refer to the remarks of Mr Burns and to my own dissections. The latter, though opposed to the observations of the last author, is supported by the experiments of Nicholl and Scarpa. In a discussion, therefore, as to facts, I prefer to appeal to the following experiment. The aorta of a female, 59 years of age, dying of acute head affection, was cut across at its point of passage from the chest, and into the thoracic extremity a large pipe was inserted; the arteries passing from the arch having been secured, the vessel was then distended with water thrown in by a powerful injection syringe. The substance of the heart soon became greatly distended through the coronary arteries. A ligature was then placed on the origin of the aorta, and fluid injected so as to greatly distend the vessel, but several of the small mediastinal vessels becoming ruptured, the water, after repeated trials, was found to escape with considerable rapidity, and no rupture of the coats resulted. The finger was then introduced into the lower opening of the vessel, and a laceration of the internal coats being made with the nail, fluid was again injected, when the

* *Diseases of the Heart*, page 233. † Tome x. p. 524.

‡ *Edinburgh and London Monthly Journal*, July 1843.

external coat became at once distended, not, however, in the form of a distinct tumour, but throughout the whole course of the vessel from the pipe to the ligature at its origin. The parts being removed from the body and dissected, the fissure was found to occupy one-third of the circumference of the vessel, and to be situated at its front, and about the middle of the descending portion. It penetrated through a part of the middle coat, and from this point a separation of the layers of that tunic was produced, extending above to the ligature on the origin of the artery, and downwards to that on the pipe. It was situated in the middle coat, and involved at the lower part, two-thirds of the circumference of the vessel being there bounded by the origins of the intercostal arteries. At the ascending and transverse portions of the aorta, the coats were separated only at the front of the vessel. In the innominate and the left carotid arteries, the separation ceased at their origin, but advanced about three-quarters of an inch along the left subclavian, surrounded its whole circle, and then, as in the other two vessels, reopened into its canal. The layer of the middle coat separated in connection with the external coat at the posterior extremity of the artery was extremely thin, but increased in thickness towards the origin of the vessel, till in the ascending portion it was fully half a line in width. Both the internal coats were, throughout the course of the vessel, free from any appearance of disease.

From this experiment, which has been frequently repeated and variously modified with a similar result, we are, I conceive, warranted in concluding with Dr Davy* that the coats of the aorta are, in a healthy state, capable of extreme distension before giving way, and, consequently, that the rupture of the internal coats of the vessel, which constitutes the first step in the formation of a dissecting aneurism, must be ascribed to their being rendered lacerable by disease; and *secondly*, that, after the occurrence of a fissure penetrating the substance of the middle coat, that membrane will readily admit the blood to effect a separation of its laminae. In this respect the experiment corresponds with that related by Dr Pennock. From experiments† of a similar kind instituted on the aorta after entire rupture of its internal coats, it appears that, though the cellular membrane between the external and middle tunics still more readily allows of separation along the course of the vessel, yet that, even where most distinct, the external coat does not alone possess sufficient density to resist the pressure of the extravasated fluid, and hence it is most probable that the sac of the dissecting aneurism will be found to occupy the laminae of the middle coat, a layer of that membrane being in all cases united to the separated external coat,—an inference which is supported by the facts, that, in each of the three recent cases which

* *Researches, Physiological and Anatomical*, Vol. i. p. 446.

† For a fuller account of these experiments see the *Ed. and Lond. Monthly Journal* for October 1843.

I have myself examined, and in those of Drs Pennock and Goddard, such was found to be the case. The results of experiments, in which the ruptures in the internal coats were of small extent, render it likely that the kind of aneurism developed will also be affected by the form and extent of the laceration. If this involve a considerable portion of the circumference of the vessel, and offer much resistance to the flow of the blood along its channel, that fluid will be much more likely to penetrate between the coats and effect their separation.

Predisposing Causes.—The increased lacerability of the coats in dissecting aneurisms is supported by observations on several of the cases. In that first related in the paper, Dr Paterson noticed when recent, the peculiar friability of the internal membrane, by which it admitted of being rubbed off with the finger, and a similar remark has been made in reference to other cases. In several, the same condition of the coats was evinced by the existence of two or more ruptures as in case 8. Though, indeed, the above experiments would convey the impression that the internal coats, being in part divided, the blood would readily penetrate between the laminae of the middle tunic, and give rise to a dissecting aneurism, such does not appear to be invariably the result. I observed, during the course of last summer, in the museum of Guy's Hospital, a very curious preparation illustrative of this point. It is the aorta of a man, 30 years of age, who died in consequence of a fracture of the spine, from a fall which occurred seven weeks before. The internal coats of the ascending aorta are ruptured transversely over a considerable portion of the circumference of the vessel, yet the tunics having become adherent around the edges of the fissure, the external coat has been partially dilated into a circumscribed aneurismal tumour. We may, therefore, infer, that, as suggested by Dr Henderson, to give rise to a dissecting aneurism, the coats of the ruptured vessels must possess a less intimate adhesion than in their healthy condition, and such seems to have been most remarkably the case in the instance which he has recorded,—the coats “having admitted of being detached with a facility not much less than that with which two moistened pieces of paper may be separated.”*

In most cases of the disease, partial or general dilatation of the walls of the artery precedes the rupture of the internal tunics. In eleven of the cases recorded, this is stated to have been observed, and while in several the dilatation had attained the extent of being twice or three times the ordinary calibre of the vessel, in one instance only is the artery reported to have been healthy. Of the nine cases, the preparations of which I have inspected, in all but three there was combined with general dilatation of the diseased vessel, a thinning of its coats, and in one or two, portions of

* London and Edinburgh Medical Journal, July 1843.

the walls were rendered perfectly translucent. The lining membrane, however, though ordinarily exhibiting some appearance of the diseased states, to which it is so subject, was, in some cases, either healthy or but little affected, and in only one or two did it display much disease. The morbid change on which the lacerability of the coats is dependent would, therefore, appear to be rather the result of acute than chronic action. The facts recorded do not enable us to judge of the connection of rheumatic inflammation, which so powerfully predisposes to diseases of the heart and vascular system in general, with the present form of disease. Several of the patients are, however, stated to have suffered from rheumatism, and in the case marked 19 there existed old adhesions between the loose and attached pericardium.

Advanced age seems to predispose to the occurrence of the disease. Of the five cases described in the paper, the ages of only two of the patients was ascertained, and both of these were, it will be remembered, in advanced life. Of ten persons, whose ages are reported, 1 was 24 years of age; 1, 47; 2, 56; 2, 60; 1, 67; 1, 70; 1, 75; and 1, 84; two others are stated to have been of middle age, and one elderly. The lady referred to by Mr Hodgson, who presented an early stage of the disease, was 70 years of age, and George II. whose case was very similar, was in his 77th year at the period of his death. Two of the patients whose cases are related by Morgagni were also in advanced life. That a large proportion of those affected with the dissecting form of aneurism should have been elderly persons, accords with the view entertained of its mode of formation, and may be ascribed to the loss of flexibility and increased brittleness of the arterial tunics in advanced life, and it is probable also, in some degree, to their less intimate attachment to each other. Circumscribed aneurisms are usually found in middle-aged and powerful subjects, and are often traceable to direct injuries sustained. The dissecting aneurism, on the contrary, results from loss of resistance in the arterial tunics, by which they give way often under the ordinary impetus of the blood.

Similar reasoning may explain the remarkable difference which, so far as the observations hitherto collected enable us to judge, obtains in the relative prevalence of the disease in the two sexes. Of 63 cases of circumscribed aneurisms, observed by Mr Hodgson in different arteries, 56 occurred in males, and only 7 in females; and if from this number those be deducted which were situated on the arteries of the extremities, to which, for obvious reasons, men are much the most subject, the proportion of males is still very great, having amounted to 23 out of the 29 cases, or to nearly 4-5ths. Of 27 cases of aneurism of the aorta, treated in the Royal Infirmary during the years 1840-41-42, the proportion of males was somewhat less, being only 18 or 2-3ds. The dis-

secting aneurism, on the other hand, appears the most frequent in females. Of the 15 cases in which the sex is stated, 10 having occurred in females, and only 5 in males, the proportion being the reverse of that in circumscribed aneurisms of the aorta, as calculated from the records of the Royal Infirmary.

Exciting Causes.—The occurrence of the rupture of the internal coats of the artery which constitutes the immediate cause of the disease, seems to have been often traceable to some sudden exertion, though, from the small number of cases which were accurately observed during life, it is impossible to speak with confidence on this point. One patient was seized while engaged in his usual occupation of a blacksmith; a second dated the occurrence of her symptoms to using great exertion in pumping water; a third was attacked after retiring home fatigued by attending a funeral; in a fourth instance the patient, a soldier, was walking from chapel to his barracks. In the third case related in this paper, the rupture was probably induced by the exertion to an elderly person of ascending the High School Wynd; and in case 19, the patient's friends stated her to have been attacked suddenly on rising from scouring the floor. In another instance, the patient was seized when engaged in earnest conversation, and in several, as probably in case 1st, the subject of which was found dead in bed, the patients appear to have been using no exertion at the time of attack.

Situations and extent of the internal rupture and sac.—The influence of the impetus of the blood on the occurrence of the primary ruptures is apparent from the comparative frequency of their situation in the different portions of the aorta. In ten cases the fissure was situated within a short distance of the semilunar valves, and probably, also, in an eleventh. In one near the origin of the *arteria innominata*. In three of the left subclavian, there being, however, in one of these, a second rupture in front of the origin of the *arteria innominata*. In three in the abdominal aorta, and in one at the origin of the left common iliac artery. In three cases the internal coats were ruptured in two or more different places.

It is probable that in small vessels dissecting aneurisms cannot take place, as the laceration of the internal coats would most probably lead to the entire obstruction of the canal, and consequent gangrene of the extremity, as occurred in the cases recorded by Mr Turner.* Like the ordinary forms of the disease, the dissecting aneurism is confined to the vascular system of red blood; no instance, so far as I am aware, having occurred of the disease being developed in the pulmonary artery,—a fact which may be explained by the thinness of its coats, and by the less impetus of

* Transactions of the Medico-Chirurgical Society of Edinburgh.

the blood impelled by the right ventricle. Cases of spontaneous rupture of that vessel are, however, recorded.

The usual extent of the fissures seems to have been from one-fourth to one-half the circumference of the vessel, but in two cases nearly its whole circle was divided. The portion of the circumference over which the separation between the coats occurred was usually a-half, or two-thirds; but this bore reference to the attachments of the artery to the adjacent parts, and to the branches given off from it. In several instances the sac, when advancing along the branches, surrounded for a greater or less extent, the whole of their circumferences, producing the appearance of one vessel entirely enclosed within a second.

In six of the cases the sac of the aneurism occupied a larger or smaller portion of the aorta at its origin from the heart; in two it commenced at the origin of the aorta, and terminated at the point of departure of the *arteria innominata*; in two, commencing at the same point, it extended to the origin of the left subclavian artery; in two to the commencement of the abdominal aorta; in one to the origin of the common iliac arteries; and in one the separation of the coats seems to have been continued as far as the popliteal arteries; in one case when the sac originated immediately behind the left subclavian artery, it terminated in the left common iliac; in three it extended along a larger or smaller space of the abdominal aorta; and in one it was confined to the left common and external iliac arteries.

Result.—The size of the sac, or the extent to which the blood had effected a separation between the coats, bore, therefore, it will be observed, reference to the situation occupied by the ruptures of the internal coats of the vessel. When these were near the origin of the aorta, the sac was usually of small extent. The thinness of the external coat of the artery in this situation, and the very imperfect support which it derives from the reflection of the pericardium, affording little resistance to the pressure of the extravasated blood, which, therefore, readily makes its way into the sac of the pericardium. Cases 1, 2, 3, 4, 5, and 6 afford examples of this description. In cases 7 and 10 the separation was carried to a great extent, but death ensued from rupture into the pericardium, as also in case 8, in which the internal fissures were situated at the transverse arch. Cases 7 and 11 differed from all these in their result, death suddenly supervening in the former from rupture of the whole of the coats of the *arteria innominata*, and in latter from perforation of the right auricle. In reference to the last termination, I have been favoured with the following remarks by my friend Mr Thurnam: "In the course of an investigation into cases of spontaneous varicose aneurisms, I had my attention directed to the cases forming the subject of your paper, with three instances of which I was particularly impressed, from the remarkable lesion of the

central organ of the circulation with which they were associated. The aneurismal disease in these cases was in its early stage, and had its seat in the ascending aorta, or arch of that vessel. The aneurism itself in none of these cases was ruptured, but was apparently still in an indirect way, the cause of death, from its being associated with rupture of one of the cavities of the heart. The first case was that of George II., the details of which, by Nicholl in the *Philosophical Transactions*, are accompanied by some ingenious observations as to the cause of the rupture of the heart. We cannot, I think, refuse to believe with this author, that the dissecting aneurism of the aorta, suddenly induced, would act as a powerful impediment to the circulation of the blood, that it thus gives rise to the distension of the cavities of the heart, and the consequent rupture of one of them. I cannot but regard the observations of Nicholl as strongly confirmed by the two more recent cases which are related by Burns (case 11) and Hodgson. In the case of the monarch there do not appear to have been any premonitory symptoms which could indicate the period of formation of the aneurismal rupture; but in both the other cases such symptoms were observed in the one four days, in the other twenty-four hours before death. The three cases taken together would seem to warrant the conclusion that, in certain conditions of the heart, the formation of a dissecting aneurism of the aorta, like any other obstruction to the circulation suddenly set up, may be sufficient to determine a rupture of that organ. It is remarkable that in no two of these three cases did the rupture occur in the same cavity of the heart, but that the right auricle, and the right and left ventricle were respectively ruptured." In a former portion of the paper I have ascribed the occurrence of the longitudinal rupture in case 8th to the obstruction offered to the flow of blood by the more distant transverse fissure, and I think it probable that in the first case, "the distinct thinning of the walls of the apex of the left ventricle, so as to form a small cavity, which was separated from the fat there deposited by an extremely thin layer of muscular fibre," formed the commencement of a process, which, had not the external wall of the sac and its serous covering given way, and allowed the blood to flow into the cavity of the pericardium, would have terminated in rupture of the left ventricle.

When the laceration of the internal coats of the aorta is situated near its origin, the external tunic and pericardium may, however, resist the current of the blood, and the patient die from other causes. Such was the result in cases 13 and 18, in both of which the patients sunk under the secondary disease of the heart, superinduced by the aneurism, and combined in the latter with uterine disorder. When the fissures are situated below the arch of the aorta, as in cases 14, 15, 16, 17, and 19, the blood, following the

law of gravitation, tends to separate the coats in the lower portion of the vessel, and rarely makes its way to its origin; and thus the disease is productive only of indirect obstruction to the circulation, and may be in no degree accessory to the patient's death.

Duration.—From what has been stated as to the course of the disease when occupying different situations its duration may be anticipated. When the internal fissure is situated near the origin of the aorta, the rupture of the external coat and pericardium usually follows rapidly the extravasation of the blood beneath it, and death is almost instantaneous, as in cases 1, 3, 4, and 8, and probably also in 2. In 6 and 12 the sac had probably existed some short time before the fatal seizure on the occurrence of the external rupture. Should the external coat and the reflected portion of the pericardium possess sufficient power to resist the pressure of the blood in the aneurismal sac, life may be prolonged and the patient may ultimately succumb, from the rupture of that membrane, or more rarely, of one of the cavities of the heart, or, as still more rarely happens, the disease may be indefinitely prolonged, and the patient may sink under the secondary diseases induced. In case 10 the patient survived the first seizure seven hours. In 5, two days; and in 7, three days. In 11, where death took place from rupture of the right auricle, the occurrence of the internal laceration was indicated by the symptoms four days previously. In case 13, in which the date of the formation of the aneurism is not known, the appearance of the sacs and the parts adjacent, render it probable that it had existed some time, and the patient sunk under the obstruction to the circulation through the original canal occasioned by the pressure of the external aneurismal tumour. In 18, the symptoms first appeared eight years before death. In case 19, where the external fissure was situated behind the origin of the left subclavian artery, the disease, according to the statement of the patient's friends, had existed for nine months, and the appearance of the newly formed sac—the distinct membrane with which it was throughout lined—the reopening of the canal at its distal extremity into a branch of the trunk from which it originated, and the smooth edges of the two apertures by which it communicated with the original artery, left no doubt of its duration having been as great as was reported.

Lastly, in cases 15, 16, and 17, the disease appears to have been unconnected with the death of the patient, and in the two latter, as also in case 19, the communication of the distal extremity of the sac with the original canal may be regarded as constituting an imperfect natural cure of the disease.

Diagnosis.—From what has been before stated as to the result of these cases, the symptoms which they induce during life may be inferred.

1. In the class of cases in which the external rupture follows rapidly that of the internal coats, the patient is seized with sudden pain and sense of constriction in the region of the heart, difficulty of breathing, vomiting, failure of the action of the heart, coldness of the extremities, and death.

2. When the external coat possesses sufficient strength to resist the impetus of the blood, symptoms similar to those referred to, viz. intense pain in the region of the heart and along the course of the large vessels, followed by rapid prostration of strength and syncope, mark the period at which the internal rupture takes place, and, after continuing for a longer or shorter period, may wholly or partially subside when their sudden recurrence indicates the giving way of the external coat, and the patient is rapidly carried off.

The case marked 5 in the appendix forms a good example of the symptoms in this class of cases. "R. D., 79th regiment, a tailor, aged 47, of dissipated habits, suddenly became faint when on his way from the chapel to the barracks, and with much difficulty reached his own room. When seen he was suffering severely from pain along the upper part of the chest, particularly under the left clavicle. He compared the pain to what he supposed would be produced if a red hot iron was thrust into his heart. His countenance was pale and anxious; his respiration greatly oppressed, interrupted and difficult; no pulsation could be perceived in the cardiac region. An anodyne and antispasmodic draught afforded him immediate relief; after a second draught, he passed a quiet night, and the following day he felt so well as to be able to resume his employment. Two days after, he again became ill, and when seen was found labouring under most distressing symptoms, resembling, on first appearance, a fit of apoplexy. He was in a state of insensibility; his breathing was laborious and hurried, and his face of a deep blue colour; and his eyes fixed and pupils dilated to their utmost. The tongue was bluish and projecting between the teeth; the pulse was quite imperceptible, and the impulse of the heart could not be felt. On dissection, the pericardium was found distended with blood, but no distinct rupture could be detected. The aorta was nearly of its natural circumference, and its coats of usual thickness; a rupture of the middle and internal coats ran transversely across nearly half its circumference, a short distance above the semilunar valves, and the external coat was separated from the middle for some distance by a stratum of coagulated blood."*

In the case several times referred to as contained in the Medical and Physical Journal, three different stages were well-marked. A gentleman, 52 years of age, who had suffered much from anxiety

* 4th. Fasciculus of Plates published by the Army Medical Department, 1842, and Dr Maclauchlan in Vol. i. of N. S. Glasgow Medical Journal.

of mind, and had laboured under rheumatism, while talking earnestly with a friend, was seized suddenly on the 16th of February with pain commencing at the chin, passing rapidly down his neck in the course of the great vessels to the chest and back, and was obliged almost immediately to go to bed. The pain continued the following day, with some tendency to syncope, and on the 18th, he became alarmingly faint while on the close-stool, but again rallied till about four the following morning, when the faintness recurred and proved rapidly fatal. These different attacks of faintness seem to have marked the several periods at which the ruptures of the arterial coats, and of the boundaries of the extravasated blood took place. The internal coats of the aorta were lacerated at the transverse arch, and the external coat separated as far as the pericardium, that cavity being distended by blood which had escaped through a small laceration. The external coat had also given way over the situation of the internal rupture, and had allowed the blood to flow into the mediastinum, and thence into the pleural sacs.

3. The symptoms of the third class of cases resolve themselves into those of the deranged circulation, and the cardiac disease superinduced, and thus resemble those attendant on the more frequent forms of aneurism, with, however, the exception, that, as the dissecting aneurism does not produce a distinct tumour, and scarcely occupies a larger space than a moderately dilated artery, no symptoms will be produced from pressure in the adjacent organs, the signs being thus absent which are most characteristic of the circumscribed forms of the affection. It may, however, happen, that the two varieties of the disease are more or less combined, a sacculated expansion being presented in some portions of the newly formed sac. Such was partially the case in 19, and the dilated portion pressing on the left ureter had caused great dilatation of the pelvis, and calyces of the corresponding kidney.

It would be useless to dwell upon the symptoms in these cases, as they are simply those of the ordinary forms of cardiac asthma.

From what has been before stated, it will be apparent that, in the present state of our knowledge, the detection of the dissecting aneurism during life must be extremely uncertain. When the disease is of sufficiently long standing, physical signs might probably be detected consisting of a combination of those of dilatation of the aorta, with a murmur caused by the flow of the blood through the opening in the internal coats; and these with the absence of the signs, produced, by the pressure of circumscribed aneurismal tumours, on the adjacent organs, might form some clue to the nature of the disease. In case 19, though the patient was carefully observed, no morbid murmur was detected over the seat of the opening into the sac, and the nature of the affection was unsuspected during life. In the case of Dr Pennock, No. 18, the internal opening

was situated near the aortic valves, and there was perceived during life, "a strongly marked rasping murmur opposite the cartilage of the third rib, and along the upper third of the sternum; and the second sound was dull and somewhat prolonged," but as 'the semilunar valves were partially ossified, and the mitral valves thick and with cartilaginous depositions in its free margins," it is doubtful how far these signs were produced by the aneurism.

These constitute all the remarks I have to offer. In the present state of our knowledge, any analysis of this subject must necessarily be imperfect. The anatomical details of most of the cases recorded are very defective, and but few of them have been under observation during life, or, if observed, have been examined with sufficient care.

It is indeed probable, that, as two cases have fallen under my own observation in less than twelve months, the affection may be of more frequent occurrence than the small number of published cases would lead us to suppose, and that no long time will elapse before the materials are sufficiently extensive to afford a full history of this interesting form of a very important class of diseases.

Explanation of the Plate.

Vide page 281, case 8.

Fig 1.—A, the origin of the aorta.

B, The vessels given off from the upper portion.

C, The transverse rupture through the internal and middle coats, situated one inch behind the origin of the left subclavian artery.

D, The second fissure in the internal coats, situated below the origin of the *arteria innominata*, and following a longitudinal direction.

E, The external coat slit up and turned back, showing the separation between the layers of the middle coat in the ascending portion of the aorta, constituting the sac of the aneurism.

F, The external coat slit up and turned back from the descending aorta, showing the lower portion of the sac.

G, a piece of whalebone placed in the separation beneath the external coat of the *arteria innominata*, to show the continuation of the aneurismal sac along the course of this vessel.

H, The situation of the fissure in the serous covering the aorta, by which the blood escaped from the sac into the cavity of the pericardium.

Fig. 2. Diagram of the aneurismal sac and artery in the descending portion of the aorta.

a, The canal of aorta.

b, The aneurismal sac, situated between the layer of the middle coat.

c, The portion of the coats remaining attached.

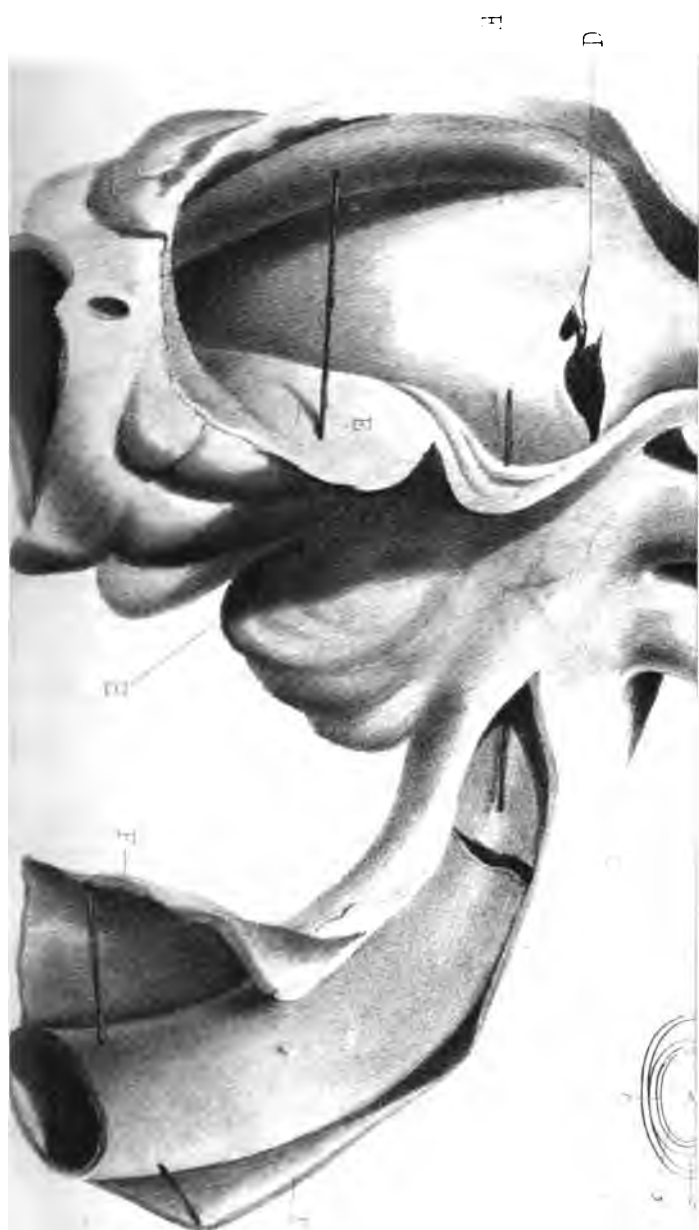
1, The external coat.

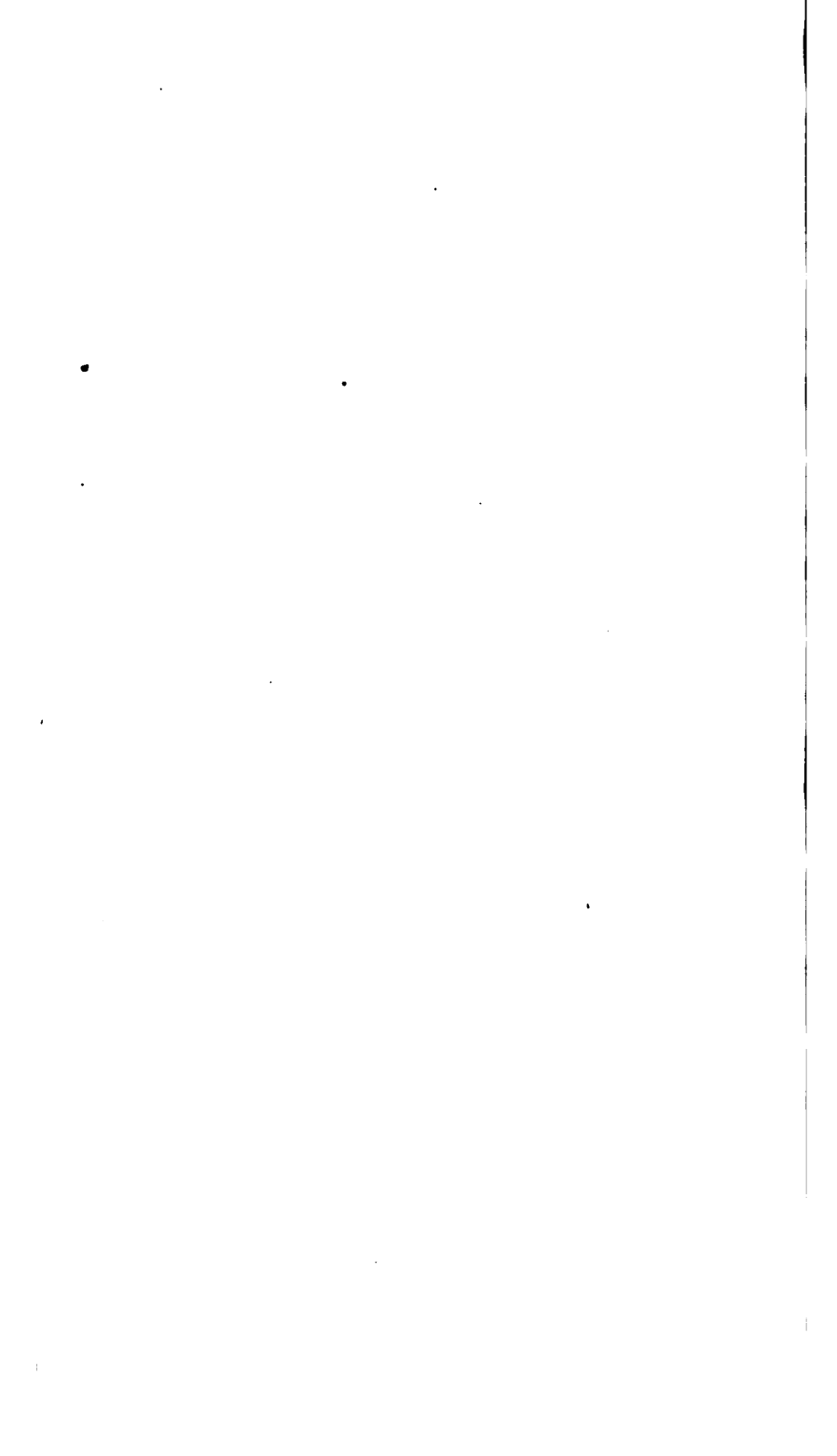
2, The middle coat of the aorta.

3, The internal coat.

APPENDIX.—CASES REFERRED TO.

CASE 3.—Edward M'Goran, aged 24. The aorta dilated from its origin to the *arteria innominata*, its walls thinned, and the internal membrane ulcerated; the fissure through the internal coats commencing above the aortic valves and running longitudinally for





two inches and then transversely ; a small sac between the external and middle coats, with an oval aperture into the cavity of the pericardium ; hypertrophy with dilatation of the left ventricle of the heart.

The patient was suddenly seized with syncope while engaged in his usual occupation of a blacksmith. He had previously complained of dyspnoea, and had never been a strong man. R. W. Smith in *Dublin Journal of Medical Science*, Vol. ix. 1826, p. 426.

CASE 4.—Mary Guise, aged 70. A transverse rupture of the internal coats of the aorta, half-an-inch in length, situated half-an-inch above the semilunar valves ; the sac extending between the external and middle coats from the origin of the aorta to the *arteria innominata* ; terminating by an external rupture into the cavity of the pericardium ; the patient was suddenly seized with pain in the region of the heart, dyspnoea and fainting rapidly terminating in death. R. W. Smith in *Dublin Journal of Medical Science*, Vol. ix. 1826, p. 426.

CASE 5.—R. D., 79 Regiment, aged 47, a tailor.

The aorta of natural calibre and thickness ; a rupture of the internal coats, situated two inches above the semilunar valves and extending transversely around two-thirds of its circumference ; separation of the external and middle coats over a small space, and escape of blood into the pericardium without a distinct fissure being detectable.

The patient was suddenly seized when walking with violent pain in the region of the heart and prostration of strength, followed, after a partial recovery during two days, by rapidly fatal syncope.

The preparation of this case is contained in the museum of the Army Medical Department at Chatham, and is figured in the 4th fasciculus of the plates. The case is more fully described by Dr M'Lauchlan in the first volume of the New Series of the *Glasgow Medical Journal*.

CASE 6.—A transverse slit through the two internal coats of the aorta near its origin, with a small sac between the external and middle coats, opening by a longitudinal rupture into the pericardium.

The patient was admitted for a rheumatic affection and pain in the side, and suddenly complained of pain in the region of the heart, fell back and expired. Elliotson, *Lumleyan Lectures on Diseases of the Heart*, p. 34.

CASE 7.—A transverse rupture of the internal coats of the aorta near the origin of the *arteria innominata* ; the external coat separated from the middle over three-fourths of the circumference of the vessel from the commencement to the arch of the aorta, and then on the left side to the popliteal arteries. The separation also extending on the *arteria innominata*, and to the bifurcation of the primitive carotid arteries, and the intercostal and abdominal branches, where

it surrounded the whole vessel. Escape of blood into the pericardium without a distinct rupture. The patient, a man of 60 years of age, was seized three days before his death with symptoms regarded as apoplectic. *Giornale delle Scienze Mediche*, quoted in *Gazette Medicale de Paris*, Vol. x. 1842, p. 524.

CASE 9.—The ascending aorta greatly dilated and the heart hypertrophied and dilated; a rupture of the two internal coats of the aorta situated beneath the origin of the *arteria innominata*, and extending over half the circumference of the vessel; the sac extending from the origin of the aorta to one inch beyond the left subclavian artery and occupying two-thirds of the circumference; atheromatous patches and bony scales in the descending, but not in the ascending aorta.

The patient had been for a considerable time asthmatic, and suddenly, when making slight exertion, expired from the rupture of the entire coats of the *arteria innominata*. J. G. Guthrie, *Lectures on Diseases and Injuries of the Arteries*, 1830, p. 43.

CASE 10.—A rupture extending through half the thickness of the middle coat, nearly one inch in length, situated three-quarters of an inch above the aortic valves; the sac occupying one-half the circumference of the vessel, and extending from the origin of the aorta to the eighth intercostal artery and along the *arteria innominata*, left primitive carotid, subclavian, and intercostal arteries; rupture into the pericardium; heart large and fat. The patient, a cook, was suddenly seized with faintness and oppression in the cardiac region and died in seven hours. P. B. Goddard, *American Journal of Medical Sciences*, quoted in *London Medical Gazette*, Vol. xxiii. p. 668.

CASE 11.—An irregular slit in the proper coats of the aorta, leading into a sac extending between the middle and external coat from the origin of the aorta to the *arteria innominata*, and bounded by firm adhesions of the coats together. Heart flabby, fat, and soft; great dilatation of the right side, and rupture of the right auricle.

The patient, a literary gentleman, 56 years of age, after labouring for a short time under incipient symptoms of cardiac disease, was suddenly seized with sense of constriction in the chest, collapse of the features, coldness of the extremities, and feebleness and irregularity of pulse; from these symptoms he partially recovered and died suddenly four days after.

CASE 14.—An horizontal fissure half-an inch in length through the internal coats of the descending aorta, leading into a sac between the middle and external coats five inches long. No history. J. G. Guthrie on *Diseases of Arteries*, p. 60.

CASE 15.—Jean Millet, aged 67, arch of the aorta dilated and studded with osseous plates and concentric hypertrophy of the left ventricle of the heart; rupture of the internal coats of the ab-

dominal aorta two inches from its origin, and occupying two-thirds of its circumference; sac extending below to the bifurcation of the aorta, and above to the arch and along the celiac artery, where it surrounded the whole of the vessel.

Death from acute cerebral disease combined with chronic disease of the urinary organs. No symptoms of aneurism observed during life. Laennec, *Traité de l'Auscultation Mediate*, Tome ii. p. 692.

CASE 16.—An aperture in the abdominal aorta three inches above its bifurcation; the sac forming an oblong tumour in the course of the aorta, and opening into the right common iliac artery three inches from its origin, and into the left $1\frac{1}{2}$ from the bifurcation. The sac lined by a distinct membrane “presenting the same appearance in the aorta, the sac, and iliac arteries.” The original trunk compressed but pervious. No history.

There is some doubt whether this, and perhaps the following case, were examples of the ordinary form of dissecting aneurism, or whether they did not originate in a gradual extension of the lining membrane between the coats. Shekelton, *Dublin Hospital Reports*, Vol. iii. p. 201.

CASE 17.—An aperture at the bifurcation of the aorta leading into a sac following the course of the left common iliac artery and opening into the external iliac by two apertures; the original canal contracted and pushed aside, but pervious.

The patient was an elderly female, who died of tuberculous disease of the lungs; the aneurism probably produced no symptoms. Shekelton, *Dublin Hospital Reports*, Vol. iii. p. 201.

CASE 18.—The heart double its natural size; great hypertrophy with dilatation of the left ventricle and dilatation of the right; some valvular disease; a fissure half an inch in length, penetrating a part of the middle coat, and situated half-an inch above the semilunar valves; the sac extending in the laminæ of the middle coat from the origin of the aorta to its bifurcation and along the *arteria innominata*, and left carotid arteries; and reopening into the *arteria innominata*; numerous foramina between the sac, and original canal in the descending portion of the aorta.

The patient, a female, 75 years of age, was seized, while engaged in pumping water, with pain in the sternum, violent action of the heart, and sense of suffocation. To these succeeded the usual symptoms of cardiac disease, which, combined with uterine disorder, proved fatal eight years after the first seizure. W. C. Pen-nock, M. D., *American Journal of Medical Sciences*, quoted in *London Medical Gazette*, Vol. xxiii. p. 668.

CASE 19.—Margaret Robertson, aged 60, was suddenly seized, nine months before her death, with faintness, pain, and sensation as if something had given way about the heart, which came on as

she was rising from scouring the floor. Prior to this, however, she had not enjoyed good health, but her symptoms afterwards became much increased. She began to suffer from pain in the chest and difficulty of breathing, sometimes amounting to orthopnoea. Three months before her death her face and extremities began to swell, and these symptoms gradually increased upon her. The impulse of the heart was natural, and the pulse small and regular. No morbid murmur was detected. On examination of the body, adhesions were found between the reflected and attached pericardium; the cavities and walls of the heart were much hypertrophied and dilated, and the mitral and aortic valves slightly thickened; the ascending aorta was somewhat dilated, and its walls thinned, but the lining membrane, though displaying punctiform redness, was smooth and free from deposit. Immediately behind the origin of the *arteria innominata* there existed a fissure one inch and one-tenth in length, running longitudinally, by which the canal of the artery led into an aneurismal sac. The edges of this fissure were smooth, and the sac, which was lined by a smooth yellow membrane, extended thence, at first in front, afterwards inclining more to the left side, as far as the bifurcation of the aorta, where it opened by a small oval aperture with smooth edges, into the left common iliac artery. On close examination the fissure was found to extend only through a portion of the middle coat, and the sac to be continued between its laminae. On the right side the intercostal arteries opened into the aorta, as did also the coeliac and superior-mesenteric arteries. The left intercostal and the inferior-mesenteric, however, communicated with the newly formed sac. At the upper portion of the abdominal aorta the sac was much dilated, and this portion pressing on the left ureter, had caused much expansion of the pelvis and calyces of the corresponding kidney. Several openings existed between the sac and aorta throughout its course, and the sac was in the upper part crossed by numerous small bands aptly compared to *cordae tendinae*, but which proved to be the small arterial branches enveloped in a layer of lymph similar to that lining the sac.

In this case it will be perceived there existed two channels for the circulation in the left lower extremity, one through the aorta, which was much compressed and flattened, though probably of its usual calibre, the other through the newly formed sac; the latter contained no coagula except in the dilated portion, where there existed several masses, not, however, decolorized.

This case occurred in the practice of Dr Henderson in the Royal Infirmary, and is more fully reported in the Edinburgh and London Monthly Journal for July 1843.

ART. III.—*Cases and Observations in Medical Jurisprudence.* [Continued from Vol. xxxv.] X. *On the Poisonous Properties of the Bark of the Laburnum-tree.* By ROBERT CHRISTISON, M. D., Professor of Materia Medica in the University of Edinburgh.

SOME years ago I commenced in this Journal a series of cases and practical observations in Medical Jurisprudence, deduced from my opportunities of experience in the Scotch Law Courts. As they were favourably received by the profession, I regret that circumstances, which have long left me little leisure for arranging my materials, have prevented me from continuing the publication of the more interesting of the many cases which have since come under my notice. I shall now, however, resume the publication of them from time to time; and in this paper shall commence with a singular case, which, so far as I am aware, is the first of its kind yet made public.

X. *Trial for Poisoning with Laburnum-Bark. This bark is a poison of great energy. Notice of experiments with it on animals.*

It is not unknown that the laburnum-tree produces poisonous seeds, the activity of which is such as to render it not unlikely that in no large quantity they might prove fatal. Less attention, however, has hitherto been paid by practitioners and toxicologists to the properties of this plant than it appears to deserve. For it seems highly probable that almost every part of it is more or less poisonous; and an occurrence, which came incidentally under my notice a few months ago, has satisfied me, to my great surprise, that on the one hand the activity of one part of its organization is very intense, and on the other, that its deleterious effects are so familiar to unprofessional persons in some parts of this country, as actually to have led to its being made use of for criminal purposes.

The amount of knowledge at present possessed on the subject may be summed up in a few words. In the last edition of my Treatise on Poisons it has been arranged under the narcotico-acrid class of poisons; and the following brief account given of the properties of its seeds. "The deleterious properties of the seeds are well known to the vulgar of this country; and I have been informed of accidents having happened in this city which fully prove that it is a poison of no little energy. I have not been able to obtain the particulars of these cases; but the symptoms are commonly understood to associate the laburnum-seeds with the narcotico-acrids. In two cases, however, which have been communicated

to me by my colleague, Dr Traill, the effects seem to have been almost purely narcotic. In one of these, that of a child two years old, the first evident effects were sudden paleness and a fit of screaming, followed immediately by insensibility, and then by coldness of the whole body and lividity of the face; but vomiting having been induced by warm water and mustard, the seeds were discharged, the symptoms abated, and next day he was well. In the other instance, a boy was left by his companions at Dr Traill's door in a state of complete insensibility, with froth at the mouth, and a feeble pulse. An emetic, administered immediately, brought up a large quantity of laburnum-seeds; after which the pulse became firmer, and the sensibility speedily returned. The accidents produced by it have been chiefly owing to children foolishly eating the seeds; which, considering their nauseous, bitter taste, one would scarcely expect any child to attempt."—Pp. 841, 842.

In addition to the information contained in this extract, it may be farther observed, that, according to *Cadet*, [Bull. de la Soc. de Pharm. 1809, 48,] the young pods of the laburnum-tree have been known to produce in small quantities severe vomiting, and profuse protracted diarrhoea; that the leaves are stated by a good authority, *Vicat*, [Hist. des Plantes Vén. de la Suisse, 1776, 49], to possess the property of acting violently as an emetic and purgative; that, according to a set of cases, eleven in number, which occurred near London in 1840, small doses of the seeds, such as from one to five seeds, occasion in children sometimes drowsiness, dilatation of the pupils, and languid pulse, sometimes nausea, vomiting and purging, and sometimes both of these effects, [*Mr Bonney* in *Lancet*, 1840—41, i. 252]; and finally, that the bitter extractive principle, called cytisin, which was discovered in the seeds by MM. Chevallier and Lassaigne, is stated by these chemists to be capable of killing animals in small doses with vomiting and convulsions, and of causing in the human subject giddiness, spasms, frequency of the pulse, and exhaustion, in the small dose of eight grains.

During a late search for cases of poisoning of all kinds, through the domestic and foreign periodical press of the last ten years, I have been unable to find any other illustrations deserving notice relative to the effects of laburnum; and nowhere is any mention made of the bark as a poison.

It was with some interest, therefore, that a few months ago I received for consultation the following singular case, which has since been made the subject of a trial at the last Inverness Circuit.

A lad, Hugh Gordon, 18 years of age, a farm-servant in the parish of Dornoch, in Ross-shire, was on bad terms with his fellow-servant,

the cook, on account of some petty grievances, real or imaginary; and bethought him of punishing her by administering some substance which should cause vomiting or purging. On conversing with his acquaintances on the subject, one of them suggested to him for the purpose the "French-broom-bark;" by which name is understood in Ross-shire the *Cytisus Laburnum*, the common laburnum-tree. And his informant added for his more particular instruction, that "he must mind how he cut the bark; for if he cut it off the tree from below upwards, it would make a vomit; if he should cut it downwards, it would make physic; and if he cut it across, it would kill." With these instructions, he cut the bark in presence of a witness "for a vomit only," that is, from below upwards, and carried off a piece about one or two inches square.

The bark in its dry state was put into the cook's broth by Gordon, with the privity of another female-servant, who witnessed the whole proceeding, and was aware of the lad's purpose; so that she became an accessary, and was charged as such by the law authorities. The two culprits partook of the same broth, but without this seasoning; and they sustained no harm. The cook, who remarked at the time, "a strong peculiar taste in the broth, which it ought not to have had," soon became very ill, and in five minutes was attacked with violent vomiting. As the account of the symptoms was not taken till six months afterwards, when the cause of her illness was first discovered, the details are necessarily imperfect. It appears, however, that after the first attack of vomiting, which occurred at three in the afternoon, one day in the month of April of last year, the retching and vomiting continued incessantly throughout the whole evening, night, and subsequent day; that there was at the same time shivering, general pain in the belly, especially in the stomach, and such feebleness from the moment she first took ill, that she with difficulty walked to her bed; and that severe purging also occurred on the morning of the second day. It was some days before she recovered so far as to be able to resume her work. The sickness, vomiting, and purging, however, continued to recur in some degree daily; she complained of pains throughout the abdomen; she rapidly fell off in looks, and flesh, and strength; at Whitsuntide, about six weeks after she first took ill, she was forced to give up service; and her complaints went on without any intermission, except in degree, till November, when she was visited for the first time by a physician, Dr Ross, who was sent on the part of the law authorities to investigate the particulars of the case. Dr Ross found her labouring under symptoms of marked gastro-intestinal irritation, such as vomiting, especially after food, pains in the abdomen, increased by pressure, diarrhoea with tenesmus and slightly sanguinolent stools, flatulent distension of the belly, and the

like. She had likewise great debility, impaired appetite, hurried and laborious respiration, a rather frequent and easily excitable pulse, strong bellows' sound over the roots of the large vessels at the heart, a pale countenance, bloodless lips, and a pale, glazed tongue. Dr Ross considered her at that time in a highly dangerous state.

When consulted about this case a month afterwards, I was led by the unusual occurrence of so protracted an illness after poisoning with a vegetable substance, which must have been in all probability discharged,—to suggest the propriety of a minute examination of every organ, with a view to ascertain whether there might not be some organic disease of one or other of the great abdominal viscera, with whose chronic disorders it is well known that the alimentary canal often remarkably sympathizes. But after a careful examination, no sign of organic disease could be detected in any other organ except the alimentary canal; and Dr Ross's diagnosis in this respect was confirmed by the woman's eventual recovery,—which took place very slowly, however, and was not altogether complete at the time of the lad's trial in April last. Considering, therefore, the whole progress of the case, together with the fact, that the woman enjoyed excellent, and even robust health, previous to the administration of the *Laburnum-bark*, no other view, in my opinion, could be taken of the whole circumstances, than that, if the bark caused the first symptoms, it also occasioned all the subsequent illness.

I am thus particular in endeavouring to trace the whole details and their reciprocal connection; because the woman's illness, in all its circumstances, is somewhat different from what might have been expected from such a poison. Let me now advert to the question, whether such effects as were here observed may be clearly referred to the agency of the substance alleged to have been administered.

That the substance given was *Laburnum-bark*, there can be no doubt. One of the culprit's companions saw him cut it; he himself confessed he administered what he was seen to cut; and a portion of the bark, with a few pods, taken from one of a row of trees of the same species, from one or another of which the bark employed by him had been obtained, was sent to me, at my request, for identification, and proved to be the undoubted produce of the *Cytisus Laburnum*.

Now, as to the possibility of this substance producing the effects observed in the case, it may in the first instance be remarked,—and the fact is not a little singular,—that I have not hitherto been able to find a single observation, in any toxicological author, on the effects of the bark of the *Laburnum*, however well known they seem to be to the common people in the northern Highlands.

In the absence of direct information on the subject, it is fair to presume that the bark may cause vomiting and purging, since these effects are ascribed both to the leaves, and the young pods, and the seeds of the tree. For it is well known, that in many natural families of plants, and, among the rest, in the *Leguminosæ*, to which the Laburnum-tree belongs, there is a close agreement between the leaves and the bark in their action on the human body. Still, as there exist exceptions to this general law, the inference founded on it is but presumptive; and it needs scarcely to be observed, that in medico-legal toxicology, presumptions, while they may lead to evidence, cannot be admitted as evidence themselves. It became necessary, therefore, to ascertain the properties of laburnum bark, by direct experiments on the lower animals.

Dr Ross, at my suggestion, made some experiments of the kind, of which the following were the results. A tea-spoonful of the powder of dry laburnum bark was administered to a cat. Soon afterwards it was seen to writhe apparently in great pain; but in a short time it vomited violently, and thus cleared out its stomach. It looked languid and dejected for the rest of the day, and then quickly recovered. Sixty-nine grains of the same powder were then administered in porridge to a collie dog. In ten minutes it whined and moaned, then violently vomited all its food, and soon got well. On a second occasion twenty grains were found sufficient to act upon this animal as an efficacious emetic. These experiments show that the bark of laburnum is an irritant, and one too of no mean energy. But the facility with which the dog and cat evacuate the stomach renders it impossible to ascertain in their instances the poisonous effects of the bark, in all their details, by the simple method of administration with the food. Neither does it appear to me that the method, which consists in confining the poison in the alimentary canal by a ligature on the gullet, is here very applicable; because the circumstances in the case which an experimental inquiry was intended to elucidate, are such as to require the uncombined effects of the poison to be observed for a longer period than it is possible to do after the operation of tying the gullet.

In undertaking an experimental investigation on my own part, therefore, it appeared advisable to try in the first instance the effects of the bark on the rabbit; as this animal does not discharge irritating substances from its stomach by vomiting. I accordingly administered to a full-grown rabbit, by means of a catheter introduced into the stomach, an ounce of infusion of laburnum-bark, containing the active matter of 62 grains of the bark; and that there might be no question as to the identity of the substance employed, the bark made use of was that sent to me from Ross-shire, as having been taken from one of the trees in the row where the culprit Gordon

got *his* bark. The result, I must confess, astonished me. In the course of two minutes the rabbit began to look quickly from one side to another, as if uncertain in which direction to go, then twitched back its head twice or thrice, and instantly fell on its side in violent tetanic convulsions, with alternating *emprostotonos* and *opisthotonos* so energetic, that its body bounded with great force upon the side up and down the room. Suddenly, however, all movement ceased, respiration was at an end, the whole muscles became quite flaccid, no sign of sensation could be elicited, death in short had taken place, and that within two minutes and a-half after the poison was injected into the stomach. The body was opened in two minutes more, and the heart was found gorged, but contracting with some force, and capable of contraction under stimuli. The stomach was found filled with green pulp soaked with the infusion; the muscles were contractile. No morbid appearance was visible anywhere.

This single experiment left no doubt that *laburnum bark* is a poison of unexpected energy; but the effects of course associate it with the narcotics, not with the irritant poisons.

Dr Ross subsequently repeated this experiment, and found that one rabbit died in half-an hour and another in three-quarters of an hour after small doses of the infusion were injected into the stomach with a catheter; and that a third rabbit also speedily died after eating greens which had been impregnated with the infusion. In all these instances convulsions were the leading symptoms produced.

Other occupations have prevented me from following out farther this inquiry into the properties of the *laburnum-bark*. A more complete inquiry would doubtless present results of no little interest. The facts now brought forward are in the meantime sufficient to prove that this poison is one of exceeding energy; that it is a narcotico-acrid poison; that in large doses, yet still in quantities of no great amount, it acts with violence and celerity as a narcotic; and that in small doses it is a dangerous irritant, acting with force both upon the stomach and intestines. It needs scarce be added that facts of so much importance, and which relate to a substance so common and so easily obtained by every one, ought to be more generally known than at present.

The young man Gordon, who was tried for the crime, pleaded Guilty. He received a mild punishment, as it was evident that he had no intention to do serious injury to his fellow-servant.

ART. IV.—*On the Distinction between Healthy and Buffy Blood in minute quantities, illustrated by Figures.* By T. WHARTON JONES, F. R. S., Lecturer on Anatomy and Physiology, London, Corresponding Member of the Imperial and Royal Society of Physicians and Surgeons, Vienna, &c.

LET a drop of healthy blood, immediately on being drawn, be received on a plate of glass, and thinly spread out by having another but thinner plate laid over it. If forthwith held up against the light, and closely examined with the naked eye, it will present a uniform aspect, but in the course of half-a minute or so it will begin to appear finely mottled.

If a drop of blood, such as would present the buffy coat, be treated in the same way, it will, in the first place, become more thinly spread out than the healthy blood, not being so thick; and, in the second place, the mottled appearance will be found presenting itself at once, and that much more evidently than in healthy at the end of a minute or so. In buffy blood the mottled appearance has in that time increased still more.

The difference appreciable to the naked eye, then, between healthy blood and blood such as would present the buffy coat, when treated in the manner above described is, *1st*, that healthy blood is thicker than buffy blood; *2d*, that in healthy blood the mottled appearance does not present itself for half-a minute or so, and when it does, it is very minute; whereas in blood such as would present the buffy coat, the mottled appearance takes place with such rapidity, that it is found presenting itself as soon as the examination can be made. It is, moreover, more distinct from the largeness of the clear interspaces, and becomes still more so.

This characteristic of buffy blood, originally pointed out by Schröder van der Kolk, has been much insisted on by Dr Alison.

What is the explanation of these appearances, and the cause of the differences in them, as presented by healthy and buffy blood? Microscopical examination gives the following answer.

If a drop of newly drawn healthy blood be spread out as above directed, and immediately examined under the microscope, the red corpuscles are observed dispersed confusedly about in the *liquor sanguinis*. See Plate IV. Fig 1. Such is the condition on which depends the uniform appearance first seen by the naked eye.

In the course of half-a minute or so, the red corpuscles are seen to overlap each other, then rising up on edge to become fully applied side to side. Plate IV. Fig. 2. By this arrangement, like coins in rolls, they occupy less space than when they are irregularly dispersed. The consequence is, that the field of the microscope,

which was at first uniformly scattered over with corpuscles, now presents spaces containing nothing but *liquor sanguinis*, with, perhaps, an isolated red, or a colourless corpuscle floating about in it. These spaces represent, as it were, the meshes of an irregular net-work, formed by the rolls of corpuscles. Figure 3. Such is the condition on which the finely mottled appearance depends.

If buffy blood be examined in the same way under the microscope, it will be observed to present a relative diminution in the number of red corpuscles, and an increase in the quantity of *liquor sanguinis*. This is the cause of buffy blood being less thick, notwithstanding that the *liquor sanguinis* is richer in fibrin, and, consequently, admitting of being more thinly spread out under the glass, than healthy blood. As soon as the microscopical examination can be made, the red corpuscles are found already closely aggregated into rolls, and these again arranged in a net-work, with large meshes. Figure 4. Comparative fewness of the red corpuscles, and the rapidity and closeness with which they aggregate on escaping from the body, are thus the conditions on which the rapid occurrence and distinct appearance of the mottling in buffy blood depends.

The net-work of rolls has in buffy blood scarcely been formed before disruption begins to take place, and the rolls to collect together into masses, leaving between them still larger intervening spaces. Figure 5. This is the cause of the increasing distinctness of the mottled appearance to the naked eye. *

Connection between the phenomena now described and the formation of the buffy coat.—The minute process leading to the separation of the *liquor sanguinis* from the red corpuscles,—the visible condition for the formation of the buffy coat,—is the same as that just shown to be the cause of the great distinctness of the mottled appearance presented by buffy blood, treated as above described. And the way it operated in the separation of the *liquor sanguinis* from the red corpuscles is this;—by the increased rapidity, and closeness with which the red corpuscles naturally aggregate into rolls, and these, again, into a sponge-work, † the *liquor sanguinis* is squeezed out from among the red corpuscles, like a fluid from a sponge. The greater specific gravity of the

* Blood which is thin and watery admits, like buffy blood, of being more thinly spread out, and presents pretty distinctly the mottled appearance, but not with the same rapidity as buffy blood, seeing that there is not the same increased tendency in the red corpuscles to aggregate. The greater distinctness of the mottled appearance than in healthy blood is owing simply to the relatively smaller number of red corpuscles.

† The arrangement of the rolls in a net-work is exhibited only when the blood is thinly spread out, as above described. When the blood is examined under the microscope, in the form of a coagulated drop, the rolls are observed to be dispersed in every direction; thus constituting a sponge-work, in the interstices of which the *liquor sanguinis* in healthy blood remains contained.

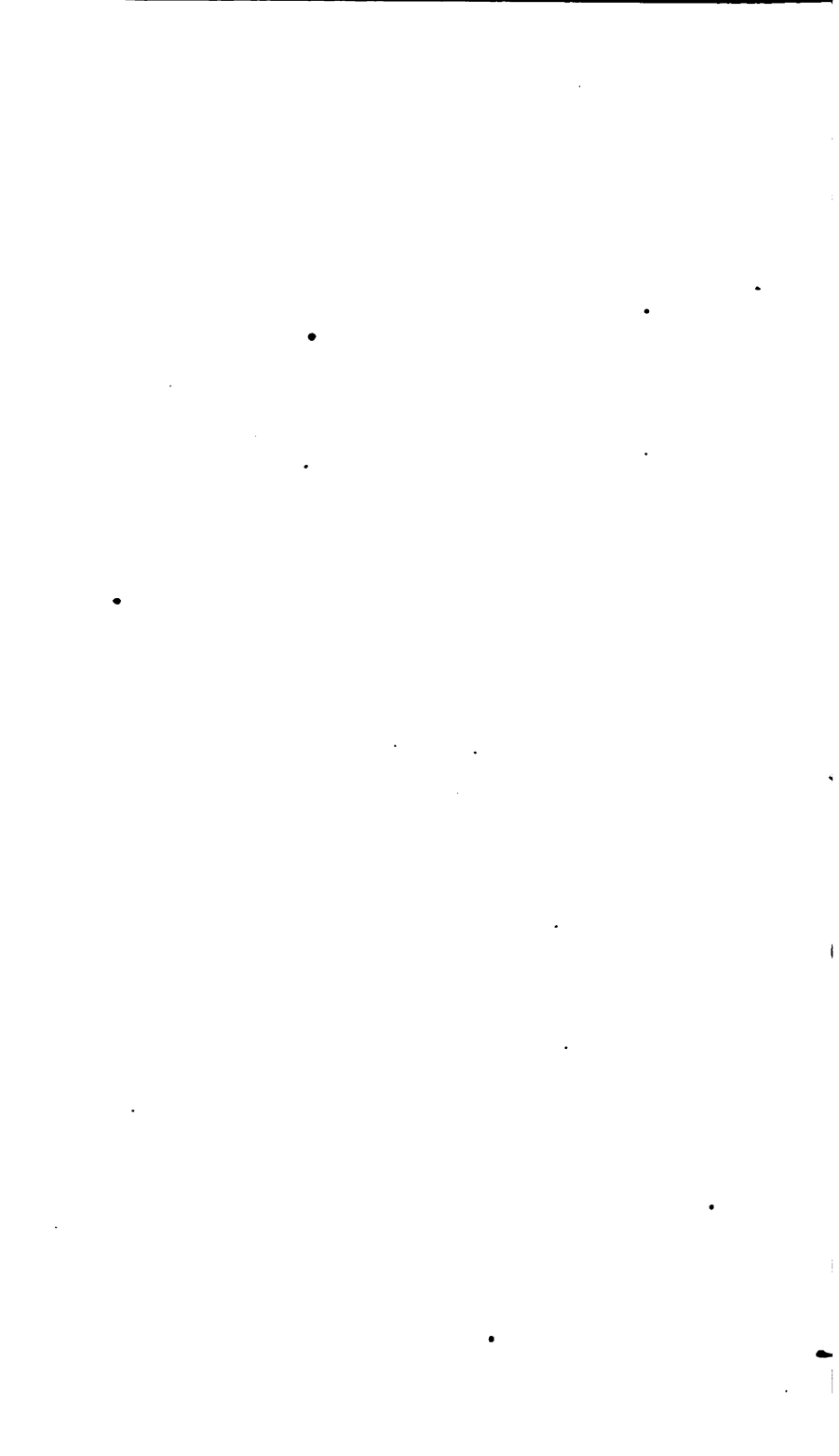


Fig 1



Fig. 2

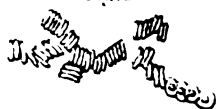


Fig 4

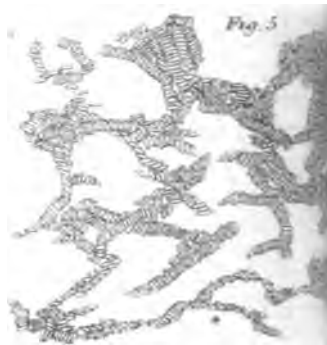


Fig 7

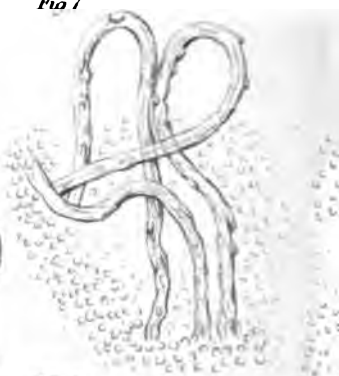
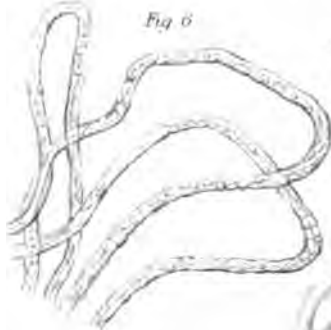


Fig 8



Fig 9



red corpuscles thus comes more fully into play, whereby the *liquor sanguinis*, which, in such cases, is in relatively greater quantity, and richer in fibrin, collects at the top, and coagulating, forms the buffy coat.

A drop of blood drawn from a prick of the finger, and a drop received from a stream issuing from a vein in the same person, present, when treated as above, each the same appearance as the other,—both, either that characteristic of health or that characteristic of the buffy tendency. A drop of blood drawn from an inflamed part, and one drawn from any other part of the same patient's body, are not found to present any difference, as regards the rapidity of the formation and the distinctness of the mottled appearance when the examination is made with the naked eye, or when the examination is made with the microscope, as regards the rapid and close aggregation of the corpuscles into rolls, and these again eventually into masses, leaving large intervening spaces.

As there are different degrees met with in the development of the buffy coat, so there are corresponding degrees in the distinctness with which the appearances considered in this notice present themselves.

It is thus seen, that, from the examination of a minute drop of blood drawn from a prick of the finger or any other part of the body, as much at least may be inferred of the state of the blood as can be done from the presence or absence of the buffy coat.*

Explanation of the Figures. Plate IV.

Fig. 1. The red corpuscles of healthy blood dispersed confusedly about in the *liquor sanguinis*, as observed when a small drop of newly drawn blood thinly spread out, is immediately examined under the microscope.

Fig. 2. Arrangement of the red corpuscles like coins in rolls when beginning and when fully formed.

Fig. 3. The irregular net-like arrangement of the rolls of red corpuscles which healthy blood presents. The meshes are small.

Fig. 4. The irregular net-like arrangement of the rolls of red corpuscles which buffy blood presents. The meshes are large.

Fig. 5. The irregular net-like arrangement of the rolls of red corpuscles which buffy blood presents, seen at the time when disruption is taking place, and the rolls are collecting into isolated masses, leaving between them larger and larger intervening spaces filled with *liquor sanguinis*.

* For farther details on the subject, see "Observations on some points in the Anatomy, Physiology, and Pathology of the Blood," by the author of this notice; originally printed in the British and Foreign Medical Review for October 1842, and since published separately.

ART. V.—*Pathological Gleanings or Cases in Dispensary Practice*. By ALEXANDER J. HANNAY, M.D. and A.M., Junior Surgeon to the Glasgow Royal Infirmary.

To the Editor of the Edinburgh Med. and Surg. Journal.

DEAR SIR,

Glasgow, 1st June 1843.

ATTACHED to the Royal Infirmary of this city is a dispensary appropriately fitted up for the reception of patients, for whom one of the medical officers prescribes in presence of a numerous assemblage of attentive students, for whom proper accommodation, as in a lecture room, is provided. So popular has this place of professional advice been made by the attentions and skill of my predecessors and my colleague, that I find no less than 4649 persons were treated at this branch of the institution during the year 1842. Congregated from the most distant parts of the country, cases of the highest interest present themselves to our observation and study. Though such opportunity affords but little advantage in a therapeutic point of view, as the patients are often negligent of the directions given them to return and report progress, yet it can scarcely be surpassed as a field for the practice of diagnosis and the attentive study of the phenomena of disease. I find it, I fancy, extremely instructive to myself, and, with your permission, I shall furnish you occasionally with a few of the rough sketches of disease and its treatment, which I have snatched time from the engagements of professional life to make. The remarks I attach to these pathological gleanings, as I would have you title them, are generally such as I make in the presence of, and for the benefit of the gentlemen prosecuting their studies at this institution. Some of them are added also with the view of putting on record opinions and practical truths to which I attach some importance, and perhaps not unworthy the attention of the younger members of the profession. I shall also occasionally introduce notices of such interesting cases as may be connected with the subject under consideration, though they have occurred in private practice, and not in the field from which I intend to glean. I regret that I cannot find time to attempt at least an arrangement of the cases. This I find to be impossible without more leisure than I am master of; so that I must either allow my observations to go unrecorded, or beg the favour of your taking them from my pen nearly in the order in which they occurred to myself.—I have the honour to be, Dear Sir, with much respect, your very faithful, A. J. HANNAY.

CASES.

I. *Sarcomphalos or Schirro-Cancer of the Umbilicus.*

II. *Evertatio or enormous congenital Umbilical Hernia, with notices of other diseases at umbilicus.* III. *Bloody Cyst in neck.* IV. and V. *Serous Cysts in neck.* VI. *Strumous collection in neck.* VII. *Phosphate of lime formed in a strumous gland or abscess.* VIII. *Chronic Hydrocephalus treated beneficially with liniment of ipecacuanha to scalp.* IX. *Infantile Convulsions treated with ipecacuanha externally.* X. *Hydrocephalus Eternus and convulsions treated with the same.* XI. *Chronic Synovitis of knee treated with the same.* XII. *Ulceration of Scalp and exfoliation of portions of external table of Skull produced by tartar emetic ointment.* XIII. *Incipient Phthisis treated with ipecacuanha liniment.*

CASE 1.—*Sarcomphalos or Schirro-Cancer of Umbilicus.*—J. M., aged 50, a farmer, of dark complexion and anxious look, a spare but muscular and well developed man. The cavity usually presented at the umbilicus is filled up and covered by a thin scab. On grasping the umbilicus betwixt fingers and thumb, there is felt an unequal nodulated very hard and tender mass about the size of half a small hen's egg, dipping deep into the abdomen or centrad. This growth, which began about six months ago, is the seat of frequent stings of pain through it, preventing sleep; its surface occasionally bleeds. Though very firmly fixed to the walls of the abdomen, and consequently very immovable, it does not seem to adhere to any of the viscera within. Its limits are very distinct and defined. No glands in groin or axilla enlarged or painful. Percussion over the abdomen is natural. He has shooting pains in the hepatic region, which extend to his right shoulder, but there is no hardness or tumour to be felt or detected by percussion in the course of the ligament connecting the umbilicus and the liver. He can assign no cause. He has done nothing for it but apply a poultice. Some weeks ago a surgeon applied caustic to it; and before this the skin was entire. A consultation very properly declined interfering in the way of excision, and he went home with directions calculated to palliate symptoms. For nearly three months this man lingered in the most excruciating pain from the tumour and in the pelvis. Before death his exhaustion and emaciation were extreme. No external disease seems to have presented itself in the progress of the case.

I do not know whether the practitioner proceeded on any experience in making this application. Caustics have been advised in a like case, however; but the result of such treatment in the only case I know of where it was applied, should have deterred from a repetition of the practice. A hard tumour in the umbilicus of a

woman 50 years of age was treated in this way by a quack. The caustic seems to have destroyed it so as to convert it into a shape somewhat like a very large mushroom, $5\frac{1}{2}$ inches in circumference, adhering by a peduncle. Her local and constitutional sufferings were extreme. To afford her the only chance of relief, the tumour was removed by excision; immediate relief and ultimate recovery were the result.—*Journal de Med. Chirurg. &c.* Tom. iv. p. 374. I think it very doubtful if this case were malignant or cancerous.

Boyer informs us that no benefit results from topical applications in fleshy growths of the umbilicus, and warns us against using caustics, as they induce malignancy—advises us to be careful to ward off all irritation of the swelling, and to leave the rest to nature—sanctions the excision of the tumour, if it be fairly cancerous, and gives directions for the operation. This, however, is not always practicable, from the parts involved in the swelling and the inability of the patient to bear the operation and its consequences,—uncontrollable hemorrhage or peritoneal inflammation. I do not think the experience of British surgeons in cancerous diseases gives much countenance to the use of the knife in such a case; and where the case is not malignant, operative interference, whilst it subjects the patient to no small risk, especially if the tumour deeply involve internal parts, will, I apprehend, be unnecessary.

Tumours at the umbilicus or exomphali* are not rare, if I may judge from even the cases which have presented themselves during the period I have had the charge at this institution. They are, however, very different in their nature and consequences, and must be distinguished from each other. There was lately presented to us a case of umbilical hernia or exomphalos. Now it is possible that carelessness or ignorance might lead us to mistake the more solid tumour of sarcomphalos for a case of umbilical hernia or *vice versa*. I would notice briefly the symptoms which would distinguish a fleshy tumour in this situation from an umbilical hernia. The latter can generally be reduced, and passes into the abdomen with the peculiar sound attendant on reduction, if it be intestinal. Immediate percussion also, in the case of the tumour being intestinal, affords characteristic clearness of sound. If omentum, the benefit from sound is not afforded us in our diagnosis. But we can reduce it, and we distinctly feel in both cases the edges of the opening by which the protruding part had passed. When the tumour is gradually and slowly developed,—when it neither is diminished nor reduced by pressure,—when it grows steadily harder,—and lastly, when it causes neither a sense of dragging at the stomach, or colic pains, as herniæ usually do, then we have reason to conclude that it is a fleshy tumour or sarcomphalos.

* This term I find to have been given to all tumours at the umbilicus by former writers. In our day it is appropriated to umbilical hernia.

Boyer, (Malad. Chirurg. Vol. vii. p. 385), the only author (to my knowledge) who furnishes any information on these tumours, mentions fleshy tumours in this situation of various kinds. Some are formed of fatty and albuminous matters round the umbilical ligament, under the thin skin at this part, rendered still more thin by the pressure produced by the swelling. They are by no means frequent, but they do occasionally occur, as a few authors testify who have described them as presenting different aspects at different periods of their course. At first the tumour is indolent, smooth, and soft to touch, nearly like lipoma or fatty tumours.

These growths augment slowly, but as they increase in size, they increase in hardness, feel fleshy, and assume a shining appearance, at length becoming absolutely scirrhus, and degenerating into cancer, destructive of the patient. Various irritations of the swelling seem to influence this progress. If they are kept quiet, they may long continue free to all appearance from malignancy, and occasion little inconvenience, but if fretted by the rubbing of the garments or by caustics, they are apt to proceed with fearful rapidity in the course pointed out.

Several cases of congenital umbilical hernia were brought for advice, but none presenting any feature of interest. I may take this opportunity, however, of putting on record a very curious case of congenital umbilical hernia. It happened early in my practical life, which may account for the impression it made on my mind, and explain, if it cannot exculpate, the insufficiency of the notes which record it.

CASE II.—Congenital Umbilical Hernia.—Mrs D., aged 22, after a very protracted and severe labour (her first) of four days and nights, with only occasional suspension of the labour-pains, gave birth at 8 A. M. of 8th May to a male child in every respect of natural appearance, except at the navel, where there was a large blue tumour, smooth and shining, like a serous membrane, of a somewhat conical shape, as large as an ordinary-sized man's fist. The cord (the vessels of which were separated) was attached to its lower part; indeed, it seems as if the bowels have protruded into and distended the cord; dissecting the vessels from each other, and forming a herniary tumour. At its margin, that is, where the clear shining membrane ends in the skin of the abdominal walls, there is a dark-red line or ring, extending in circumference for about six inches. By grasping it and gently forcing back its contents, the tumour can be emptied, and remains a whitish opaque flaccid sac. I was almost tempted to tie it.* The child was healthy, strong, and vigorous.

* I observed, in a case recorded by M. Requin, Gazette Medicale, Aout 1832, that pressing back the contents of the sac occasioned the distress of oppression and suffocation. To the best of my recollection, this did not happen in my case. I certainly would have observed this circumstance, and consequently never thought of tying the sac.

9th May. The tumour has put on a yellowish patched-like aspect, and looks like a blistered surface before the fluid is let out by cutting the cuticle. The tumour moves forcibly with each respiratory movement of the abdominal walls. It projects three inches from its base, which is about nine inches round. A considerable discharge from its surface of a serous-like fluid.

15th. The surface, at some points, continued very much like that of common blister, covered with an exudation of lymph for a day or two, and then gradually assumed the appearance now described. A large ulcerated patch on the lower surface of the tumour. The vessels of the cord are black, and the projecting part on which the ligature is, even that between the ligature and the tumour, is dark, and shrivelled, and dry. The skin of the abdomen, close to the margin of the tumour, is red, and there is a separation of the cuticle over this red line. The discharge from the surface of tumour has a most disgusting smell. Meconium has been freely evacuated, and the infant is quite vigorous, sucking most strongly.

20th. Since last report the smell has become more offensive, the discharge more copious from surface of the tumour; the red line around the base begins to ulcerate, and the whole mass is becoming of an ash-gray colour. The child can still suck, and cries most lustily.

21st. Died this afternoon, (having lived thirteen days); the whole of the exterior of the sac being in a state of absolute sphacelus. The walls of the sac (on dissection next day) I found to be one-eighth of an inch in thickness; quite opaque, and of the same colour in the dead as in the living body,—they were soft, and tore readily. The parts naturally constituting the walls of the abdomen formed no part of the sac. There were traces of the *recti abdominis* on each side, but nearly disappearing as they passed by the sides of tumour. There seemed to be a deficiency of the *linea alba* for an equal length above and below the umbilicus; and the sac seemed to me to be formed entirely of the membranous covering of the cord. I am confirmed in this opinion by the line of separation being set up exactly at the line where the separation naturally takes place, betwixt the permanent texture of the skin, and the portion of the cord destined to fall off. In other words, the exterior wall of the sac consisted of the covering of the cord, and the protruded viscera had insinuated themselves amongst the vessels of the cord, and separated them. These viscera I found to be the whole of the small intestines; the omentum, and a portion of the liver; they were all natural in formation. The serous surface of the intestines bore marks of recent increased action, but were not involved in the sphacelus of the sac. I could not satisfy myself whether the peritonæum had been protruded before these viscera, and so formed the lining of the sac. It is pro-

bable that it did, because it has been observed to do so in similar cases; but it partook of the sphacelus of the exterior of the sac, and was so matted together with it, that I could not trace it.

I am not a little astonished to find in pathological records that once such case recovered. It will be found in the *Gazette Medicale*, 4th October 1832, and Cruveilhier's *Anatomie Pathologique*, No. 31. M. Requin, the reporter of the case, expressly states that the sac was formed of the sheath of the cord, into which the viscera had insinuated themselves. I candidly confess that it required some little discipline, mature reflection, and severe scrutiny of the narrative to enable me to believe that any reparative power could have restored the immense section of the outer layers of this sac, which must have fallen off,—I say must have fallen off, because it was composed of tissue, that as certainly falls off according to physiological laws, as that the child lives. The cord and its sheath, of which the outer coat of this sac was largely, almost entirely composed, (if Cruveilhier's drawing be correct,) must fall off, (from this tumour the size of a fist,) and leave the internal parts, the peritoneum, or lining of the sac, and the bowels within exposed; all of which had to be covered by the reparative process in a weakly and emaciated infant. All this was accomplished in less than two months, and is altogether the most wonderful case I ever read. Notwithstanding its marvellous nature, the case is recorded with such apparent good faith, and bears internal evidence of its being a true narration, so unexceptionable, that I am compelled to relinquish the suspicions I entertained of the possibility of its being fictitious, and respectfully recommend the perusal of it, especially in the *Anatomie Pathologique* of Cruveilhier, where it is illustrated by an admirable delineation, and several ingenious and profound reflections, to which I gladly refer the scientific, as abundantly supplying my deficiencies, and making references to authors who give information on this topic. I would only add, that I find extensive displacement of the abdominal organs at this point, spoken of by both old and modern writers, under the term *Eventratio*. The case I record bears a resemblance to the kind of cases treated of by Bucholz de *Hepatomphocoe congenita*, Argentorat, 1708, and afterwards by Haller. Oehms, in a treatise *De Morbis recens Natorum Chirurgicis*, 1773, refers to several such, and states where information concerning them will be found by the inquirer, as do Morgagni, Friedius, Ghelerus, and Haller, in his *Opuscul. Patholog.*

I should not have noticed an affection at the umbilicus, the very existence of which is problematical, (I mean *pneumatomphalos*,) had not several notices of it crossed my path as I was looking into authors on diseases occurring at this point. Under this name are designated tumours at the umbilicus, which consist of a gaseous

fluid. I doubt not that such a tumour is a small knuckle of intestine, filled and distended with flatus, being an umbilical hernia, and requiring the treatment proper to this affection.

Sometimes the tumour at the navel is formed by aqueous fluid. If it be a portion of the fluid of ascites escaping, and projecting at this point in the form of a tumour, it has no designation attached to it. But the term *hydromphalos* is applied to designate a tumour composed of fluid contained in a cyst in connection with the cellular tissue of the peritoneum. *Hydromphalos* cannot be forced back into the abdomen as can the fluid of ascites. It is soft, transparent, devoid of pain, and occasioning little inconvenience. A puncture with a lancet cures it. Much caution should be exercised not to confound it with a hernia. Boyer affords some practical information on this kind of swelling, and those from which it should be distinguished.

Boyer also notices a *varicomphalos*, or a tumour formed at the umbilicus, in consequence of a varicose condition of the veins ramifying around this point. He, however, had never known an instance of this pathological condition. Yet he traces out a plan of cure for this possible morbid condition, and speculates very ingeniously respecting its nature and treatment. *Op. citat.* In Cruveilhier's *Anat. Patholog.* Lib. xvi., there will be found a case of *varicomphalos*, conjoined with a varicose state of the veins of the abdominal parietes. The veins maintained a communication with the *vena portæ*, through the medium of the umbilical vein, which had preserved the calibre that it presents in the fœtus.

To finish these remarks, that have extended far beyond my first intention, (though, from there being no systematic account in English medical literature of diseases of the umbilicus, I may, perhaps, be the more excused for my tediousness, and pardoned for offering these desultory and hasty notes as an imperfect outline, to be afterwards filled up, of affections not without interest and practical importance,) I would refer to Boyer for a description of a tumour at the umbilicus, formed of a fungous excrescence, sometimes presented in infants born with closure of the urethra. It is soft, irregular, and reddish, and the urine escapes from it by many openings. The urine sometimes escapes from the navel, though there be no tumour of the kind above described. *Littre, Mem. de l'Acad. des Scien., An 1701.* Cabrol (*Alphabet Anatomique, Obs. 20*) gives a case of no ordinary interest, where the urine escaped by a tumour of the nature in question, and, what is encouraging, he cured it completely. The first step is to restore the natural passage for the urine, then a ligature is put round the base or neck of the fungous growth; but I refer to Boyer for farther details.

I have more than once seen the discharge of gonorrhœa con-

taminate the surface of the umbilical cavity and produce a copious discharge of gonorrhœal matter. It yields to an astringent wash. I have also seen the projecting part the seat of psoriasis, distressing and inveterate, but yielding to alteratives, diluted citrine, and other ointments.

A crust of sebaceous matter forms in the navel of some persons which drops off leaving a superficial ulcer; cleanliness suffices for its cure; any mild ointment (*ungt. ox. zinc.*) may be applied.

An ulcer forms here also, in some rare cases, around a fistulous opening supervening on the sphacelation of an intestinal hernia, and bile as well as biliary calculi have been discharged from an ulceration and fistulous opening at the umbilicus. *Bibliotheca Anatomico-Medico-Chirurg.*, &c., Vol. iii.

A case is recorded in Lieutaud's *Hist. Anatom.*, Vol. ii., of the adhesion of the urinary bladder, when in a state of enormous distension, to the umbilicus, and subsequent bursting at that point, whereby the patient (above 92 years of age) was relieved and lived, though in great distress for many months.

CASE III.—Bloody Cyst in neck.—A child, 14 months old, in every respect healthy, was observed to have, on the lateral and posterior aspect of the neck on the left side half-way between the jaw and collar-bone, a small hardish tumour about the size of a gooseberry; it remained stationary for some months. On 18th of month it was observed for the first to be much larger, and on the 20th, it presented the following appearances.—On left side of neck, and rather behind, was a roundish tumour as large as a goose's-egg, consisting of two or more lobules, smooth, somewhat shining, and of a very indistinct, scarcely perceptible, shade of blue or venous blood colour. Its longest diameter was transverse or horizontal; it felt fluctuant and elastic; handling it seemed to occasion pain and cause the child to cry severely. A candle (lighted) was held close to it, as in ascertaining the character and existence of effusions into the *tunica vaginalis testis*, but no trace of light could be observed shining through it. Though firmly attached to the cellular tissue and the skin over it, it was pretty loosely connected to other parts. An exploratory puncture was made with a grooved needle, after which a lancet was plunged into it, and three ounces of grumous fluid blood escaped. In consequence of the thickness and size of the cyst, the tumour in the neck did not fall much, yet it was very plainly reduced, and obviously emptied of all its fluid contents.

This is the third case of bloody cyst or tumour in the neck which I have seen in the last six months; one in an infant, the other in a woman between 40 and 50. I have likewise seen two cases before that. One case was presented by the late eminent teacher of anatomy, Mr Brookes, to his class as a case of abscess, which he was proceeding to open. To the astonishment of all,

the fluid which escaped was blood, which made the operator fear that he had punctured an aneurism. I looked lately, but in vain, into all the systematic and other writers immediately within my reach, to find cases, of this nature, related and explained. I did not find a single notice of an encysted tumour containing bloody fluid, in the works of Abernethy, Boyer, Cooper (Sir A.) Travers, Cooper (Samuel), Warren, Bell (Sir C.), Good, the article "Cyst" in the Cyclopædia of Anatomy, &c. The character of all the cases I have seen are as follow. They are globular, and, with the exception of this last, of an equal surface; elastic, distended or full, fluctuant, not permitting light to pass through them, and slightly tender. They have all been quick in their process of formation, much more so than other tumours, or even abscesses. This one, from a small kernel not larger than a gooseberry, reached the size above-mentioned in less than seventy hours.*

CASE IV.—*Serous Cysts in Neck*.—Yesterday I punctured with a grooved needle, a fluctuant swelling in middle of the neck over the carotid on left side; it was size of a hen's-egg, firm, and rather solid like. It contained clear serum, and has been repeatedly, in last two years, emptied of serum by puncture. I find, in notes of my former attendance at the dispensary in 1840, the following entry of two similar cases.

CASE V.—*Serous cysts in neck*.—"Above left clavicle, and extending up from the insertion of the left S. C. mastoid, to the angle of jaw, a fluctuant tumour of an ovoid shape, colourless, painless, easily compressed, and gives the idea of a cyst not full; the skin over it very thin. Has come on slowly, being of more than six months' duration. Child in excellent health." [After a few days it was punctured, and its contents ascertained to be pure serum; it quickly refilled; the child was not brought back again.]

"A precisely similar tumour, but on the right side of the neck, occurred at the dispensary a few day ago, in a stout, healthy, elderly woman. No cause can be assigned." A few days thereafter the tumour was punctured, and pure serum escaped; it entirely disappeared, but filled again, and was as large as before the puncture in four days. I am aware that a solution of iodine has been injected into these cysts after emptying them. Union of the sides of the cyst has taken place, and a perfect cure ensued.

CASE VI.—*Strumous Collections in neck*.—The two following cases are illustrative of the different aspects the same morbid action may present; and one of them presents us with an example of what must, I think, be rare; the formation of phosphate of lime in strumous abscesses. In a boy, 8 years of age, there is a swelling on the neck, under angle of jaw, which has been long in reaching its present size, and has now become pointed and red, and

* This tumour is the *Hæmatoma* described in Craigue's Pathological Anatomy, p. 216, Chapter viii. Sect. ii. References to cases are there given.—EDITORS.

given way at its pointed part, having a little bit of matter-like softened cellular tissues ticking out of the aperture. It feels fluctuating at one or more points, but on making a puncture, it turns out to be a mass of soft clotted stuff that will not flow, between purulent matter and softened cellular tissue. Consequently, the mass of the tumour does not fall; it is now as large as a goose's-egg, and very hideous, a fungous-like growth exuding at the apertures made. These apertures, enlarged by ulceration, and exposed more of the structure of the tumour to these denuded parts. Powder of alum and blue vitriol were steadily applied, poultices at night, and lighter dressings during day. Every method that could be devised of improving the general health and invigorating the frame was pursued, and successfully. During the summer the swelling was reduced by the escharotics, and a scar smaller than we had reason to expect remained. This was a private case.

CASE VII.—*Phosphate of lime formed in a strumous gland or abscess.*—In another case, a gland under the angle of jaw in a little girl of dark complexion, and in every respect healthy looking suppurated. It was opened; a quantity of curdy serum came away; but along with this, for many weeks, there came away by the small aperture very many little bits, of a chalk-like substance, quite hard, white and gritty, as large as pins' heads. I collected nearly a drachm of these. They consisted, I found, chiefly of bone earth. I have consigned them to our accomplished professor of chemistry, Dr Penny, and hope to have his more accurate analysis of them. This sore healed readily by change of air and good diet. The scar left is extremely small, and very little observed.

CASE VIII.—*Chronic Hydrocephalus, treated with Ipecacuanha, in form of liniment externally.*—A well-marked case of chronic hydrocephalus, which was said to be congenital. The infant was in its eighth month, and the head had acquired a size much beyond natural. It presented an unnatural expression, looked languid and inactive; squinting, vomiting, and costive bowels. It had been several times attacked with convulsions, after which it lay comatose for several hours. The fontanels were large and full. I directed diuretics, (*Nit. Pot.* and *Pulv. Ipecac.*) as I have a notion that to increase the urinary discharge is on many accounts very advantageous in this disease. But it is to the effect of a liniment composed of powdered ipecacuanha root, from which decided benefit was derived in this case, that I request space for a short memoir of my trials of this remedy, first suggested to me by my accomplished colleague, Dr Easton, Professor of Materia Medica in Anderson's University. To that gentleman I sent the following results of my experience of this new counter-irritant, and beg to offer it as the therapeutic parts of my gleanings. The formula I adopt is as follows.

R. Ipecac. Pulv. ; Olei Oleæ Europ. aa. ʒij. ; Adipis Sæill. ʒss. ; M. opt. fiat linimentum fricendo admovendum.

The part we wish to irritate is to be rubbed freely with this liniment for fifteen or twenty minutes three or four times daily, and enveloped in flannels. This produces, in about thirty-six hours, or sometimes sooner, very numerous small papulæ and vesicles, seated on a deep-red base of irregular extent. They become flattened in a short period, and assume the pustular character. Many of them run together; are confluent. The part feels hot to the hand of another, and a tingling sensation, never amounting to pain, is experienced by the patient. The eruption endures pretty vividly for a few (8) days, during which the pustules become covered with a scab-like scale, and fall off, leaving no mark. They never ulcerate, as do the pustules from the tartrate of antimony. I regard the ipecacuanha as a very valuable addition to our counter-irritants. It is not over severe, as the tartrate is occasionally found to prove. Yet, with all its moderation, it is very efficient, and extremely manageable. In feeble, young, and very irritable persons it will, I feel assured, prove a very suitable counter-irritant. I specially beg attention to the use of it in the head diseases of a chronic kind in infants and young children. Many of these cases follow the suppression of eruptions and scabbed diseases of the scalp. Now, the ipecacuanha liniment produces a scabbed state of the scalp, as nearly resembling the affections in question as can be imagined, and maintaining a counter-irritation on the surface which I have proved, I think, to be a very valuable agent of this nature. I may briefly sketch a case or two in which this piece of treatment has afforded me the highest satisfaction.

CASE IX.—Infantile Convulsions treated with Ipecacuanha externally.—A boy, 2½ years of age, who had been affected from a very early period with *eczema capitis*, or *porrigo favosa*, that had been cured by change of air, and sea-bathing, was seized with convulsions, several attacks followed at intervals of weeks or months. I had his head shaved, and a crop of pustules produced by this epispastic. This ended in a thick coating of scabs nearly over the whole head, and he has not had a convulsion since, (six months.)

CASE X.—Hydrocephalus externus, and convulsions, treated with Ipecacuanha externally.—An infant, 8 months old, with a large head, and, by its total want of expression, offering the aspect of idiocy, was brought to me to have my advice for convulsion fits into which it fell almost every day or two for weeks before. I advised its parents to shave the head and to rub it freely with the liniment of ipecacuanha. The child did not return to me till this morning when I find that, for the last five months, it has kept free from fits, and in pretty fair health till

within these last few nights it has been restless and cries excessively. Its head is now covered with a favous-like scab, or crust, which came out soon after the daily use of the liniment, and has continued ever since, and has been kept up by occasional repetitions of the application. Its present complaint seems to be abdominal pains and thirst. I fear the child will prove idiotic.

CASE XI.—Chronic synovitis of knee, treated with *Ipecacuanha* externally.—I obtained very decided benefit from the application of the same liniment in a case of this nature accompanied with effusion. The patient was a cachectic, nervous girl of abandoned habits, affected with syphilis, and the complaint in the knee partook of a rheumatic nature. The joint was kept very quiet at the same time, and, no doubt, this did good also, but the maintenance of an eruption by this epispastic cannot fail to have assisted, for counter-irritants have generally been found to do good in cases of this kind. The liniment in this instance produced a very moderate, yet manageable and effectual degree of superficial irritation. Now, I have thought, that the tartrate of antimony, in form of ointment, sometimes exceeds the bounds of moderation in its action on the skin,—producing large pustules, exceedingly painful, occasionally ending in deep ulcers very troublesome and difficult to heal; and, sometimes, in the very irritable persons, (often the subjects of such diseases, as the case before us,) the cause of constitutional disturbance, and a depressed condition of the general health, very injurious to their local complaint.

CASE XII.—Ulceration of scalp, and exfoliation of portions of outer table of skull, produced by tartar emetic ointment.—I cannot avoid putting on record a case where an eminent physician applied the tartar emetic ointment to the scalp of a boy, about four years of age, to the production of pustules, followed by ulceration so deep as to lay bare a considerable portion of the cranium, several bits of the outer table of which exfoliated. The case did well in the end.

There is one way of using the tartrate of antimony externally, however, which lessens its virulence, but still leaves enough of energy to make it also a valuable counter-irritant,—as more than twenty years experience has fully convinced me.* It is in solution. One drachm of the salt is rubbed up with an ounce of boiling water in a mortar. This is rubbed on the surface we wish to irritate in the same way as I described (above) the liniment of

* *Thes. Inaug. De Tart. Antimonii usu Externo. Edinburgh, 1823.* In that thesis I gave the following formula. *R. Tart. Antim. one drachm, Mur. Hyd. Corros. five grains, Aq. Puræ one ounce, Sp. Lavand. Comp. gt. ten. M.* The muriate quickens its action in a decided manner; and I still regard this lotion as a highly valuable application to the chest in pulmonary diseases. I observe, with great satisfaction, that, in the opinion of my distinguished friend and fellow-student, Dr J. C. Williams, tartrate of antimony is serviceable in these cases and in this way. The addition of five grains of corrosive sublimate in the above formula will be found to increase its power and efficacy.

ipecacuanha. This is never productive of the evils charged against the liniment. Its effects approach nearly to that of the ipecacuanha liniment. Both, particularly the liniment, may be continued or persisted in for a longer period, and what it wants in energy may be made up for by its longer agency.

I have used the liniment in chronic affections of the chest, and, to my mind, with satisfactory results, certainly as decidedly good effect as any of the epispastics,—over which its mild and manageable nature gives it a great superiority.

CASE XIII.—*Incipient phthisis treated with Ipecacuanha liniment.*—I have used it in threatened phthisis in several instances, and was induced to use it in one of these cases from the symptoms having followed the nearly total disappearance of a very universal affection of the surface for years by *psoriasis guttata*. In this young woman the eruption was produced over all the front of the chest and between the shoulders. Her cough has not troubled her since the eruption was fully formed. Seven crops of papulæ or pustules have been produced.

ART. VI.—*History of a Monstrosity presenting remarkable peculiarities in the arrangement of the Nervous System; with a brief inquiry into its Teratological and Medico-Legal relations.* By HENRY LONSDALE, M. D., Fellow of the Royal College of Physicians, and Lecturer on Anatomy and Physiology, &c. &c. No. 1, Surgeon's Square, Edinburgh.

THE circumstances connected with the birth, and the peculiar malformations and deficiencies in the nervous centres of the fœtus forming the subject of the following remarks, will, I am led to think, be found deserving the attention of the practical physician, equally with him who is more interested in physiological and teratological inquiries.*

A female belonging to the labouring class residing in the north of England, who, if I remember rightly, had borne several children, and all well-formed and healthy, was delivered, eighteen months ago, of a female child, at the full term of utero-gestation, exhibiting some peculiarities about the head, which immediately attracted the notice of those in attendance. The child was reported by the surgeon-accoucheur to have breathed. This statement, coupled with some remarks which fell from the same gentleman immediately after the delivery, and more especially, perhaps, the natural curiosity excited in the minds of the female attendants

* The case was introduced to the notice of the Royal College of Physicians at one of their evening meetings in June.

by the unusual appearances which the child presented, led the more gossiping portion of the community to whisper that the surgeon, knowing the child to be a monster, had destroyed it in the birth. These rumours had been afloat for several days, until at length the registrar of the parish conceived it necessary to acquaint the coroner with the circumstance, and on the ninth day after delivery, the body of the infant, by his direction, was disinterred,* and a jury was summoned to inquire into the cause of its death. The *post mortem* examination was intrusted to my much esteemed friend Dr Oliver of Carlisle, in conjunction with Mr Rome of Longtown.

I shall here allude only to the more important circumstances of the *post mortem* inspection,—those which sufficed the medical witnesses to form their opinion as to the important question of the child's viability; reserving the minuter anatomical details to be discussed under the head "*anatomical characters*."

The body and limbs of the fœtus were well formed. A large tumour was found to occupy the occipital region, and the posterior part of the neck: this tumour was distended with bloody-coloured serum. The anterior and middle lobes of the brain appeared to be properly developed, and occupied their usual positions in the cranial cavity, whilst the posterior lobes were much smaller, and were partially squeezed through a large abnormal opening or deficiency in the occipital bone. The cerebellum and that part of the occipital bone in which it is normally lodged were wanting. There was not the slightest vestige of *medulla oblongata* or spinal chord, and the posterior arches of the vertebræ did not exist. The lungs sank in water, as well separately and in cut portions, as with the heart attached to them. The medical gentlemen reported as the result of their examination of the body, that as certain portions of the nervous system, which in their belief were essentially requisite for the performance of the respiratory functions, were totally wanting, they had no hesitation in concluding, that the child could not have breathed; and that they were confirmed in this conclusion, by finding no evidence whatever of the lungs having been inflated. The medico-legal investigation ended here; the jury returning a verdict of "Natural Death."

The facts of the foregoing narrative were mentioned to me personally by Dr Oliver two days after their occurrence. I cannot here overlook the kindness which prompted him to place the fœtus in my hands for a more minute dissection† than was possibly consistent with the time and opportunities afforded those who are called upon to conduct a *post mortem* examination, whilst

* These circumstances occurred during the severest cold of winter, (January 1842), and when the snow covering the public roads was several feet in depth. The tissues of the body had, therefore, not suffered from decomposition.

† In speaking of more minute dissection, I refer especially to the anatomy of the nerves.

a coroner and jury are waiting the results of the investigation in an adjoining room. The reader must not suppose from the above remarks, that the examination was hurried in the slightest degree. The thoracic and abdominal viscera had been carefully examined by my friend and his coadjutor, after they had notified the malformations in the nervous centres, and the inadequacy of these to maintain the springs of life in action, in a being no longer dependent on its maternal sources for nourishment.

To adopt a methodical arrangement of the historical details of the present case, and to render the remarks which naturally suggest themselves in connection with it, as practically useful as their character will admit of, I shall describe, *first*, the configuration and minute anatomy of the fœtus; and *secondly*, endeavour to point out the position which it ought to occupy in the classification of monstrosities adopted by modern authors; and *finally*, allude to its medico-legal relations.

Anatomical Characters.—Externally.—The fœtus, as already stated, was of the female sex,* fat and plump. Its limbs were well-developed, and when placed on its back, nothing irregular could be perceived about the head, face, or trunk. Whilst the anterior, superior and lateral regions of the cranium presented the normal characters of a child at the full period, the integuments were more or less covered with hair; the occipital region, considerably elevated, was occupied by a soft and elastic tumour, whose size was little short of the fœtal head, and which extended laterally and posteriorly so as to conceal part of the neck and likewise a small portion of the back. The common integument formed the external wall of the tumour,—that part which looked towards the vertex being covered with hair. Below the tumour, the dorsal region appeared at first sight normal; a closer examination, however, detected the absence of the spinous processes, and an unusually flattened appearance at the lowest part of the vertebral column.

Internal Appearances.—Encephalon.—An incision was made through the frontal bone at a point immediately above the nose, and continued directly backwards along the sagittal suture to the occipital bone; the flaps were thrown outwards, and in this way the anterior and upper surfaces of the brain were exposed. At this stage of the dissection, it was noted that the vessels of the *pia mater* were much distended, and that the cerebral structure

* It would appear that the majority of human monsters, at least, where the nervous system is at fault, belong to the female sex. Morgagni advocates this opinion, which has since received the sanction of Sandifort, Sæmmering, Meckel, Tiedemann, and others. The reports of cases being found in isolated journals, it is difficult to ascertain the exact proportion, but Meckel (*Descriptio Monst. Nonnullor*, p. 51,) who collected ninety-one cases, found that fifty-three were of the female and thirty-eight of the male sex.

presented the usual healthy characters. The division (along the centre) of the small part of the occipital bone that had been developed, and the integuments forming the wall of the large sac, as also the integument along the mesial line of the dorsal aspect of the body, were next accomplished. This dissection exposed the contents of the tumour, which consisted of bloody-coloured serum. The same kind of fluid occupied the ventricles of the brain and the sub-arachnoid cellular tissue of the base. On the escape of the fluid from the tumour a marked deficiency in the occipital bone (afterwards discovered to be that part which extends from the *foramen magnum* to the occipital protuberance) was detected, and a portion of the cerebral substance about the size of a large walnut protruded through it into the tumour or sac. This portion of nervous substance evidently belonged to the posterior lobes, and was connected at the base of the brain with the *Pons Varolii*, or rather an irregular nodulated looking mass found in the position of the *Pons*. On lifting up the anterior lobes for the purpose of examining, in the usual way, the base of the brain, the presence of a quantity of dirty-coloured serum, similar to that met with in the occipital tumour, rendered the dissection less clear than in other parts. There seemed little doubt, however, of the normal characters of the structures until approaching the position of the *Pons Varolii*, where the nervous substance terminated abruptly. It was found difficult to specify the exact characters beyond what have just been stated of the posterior terminating portion of the base of the brain. The absence of the *cerebellum*, and of that portion of the wall of the cranium which encloses this part of the encephalon, renders it extremely probable that this abrupt termination or nodulated portion of cerebral substance did not constitute a true *Pons Varolii*. There was not, as has before been stated, the slightest vestige of *medulla oblongata* or *medulla spinalis*.

Dura Mater and Spinal Column.—The *dura mater* was observed to line the walls of the cranium, and to be continued to the inner surface of the tumour, where it became closely connected with the integument. Tracing it from the tumour towards the neck, some shreds* only could be met with in the spinal canal, and these in pretty close contact with the posterior part of the bodies of the vertebræ. The extreme tenuity of the integuments covering the spinal canal prohibited the supposition of the *dura mater* lining their inner surface in the manner observed to exist in the interior of the sac. The circumstances above narrated evi-

* This appearance in a case that presented some characters analogous to the *fœtus* whose history I am recording, may have led Professor Duges to say that the spinal canal was filled by a filamentous stratum, ("une couche filamenteuse"), apparently the remains of the spinal cord. The microscopical examination inclines me to believe that the shreds noted above were fibrous, and belonged to the *dura mater*.

dently point out that such a membrane was uncalled for in the absence of that important division of the nervous system which it naturally encloses.

The deficiency in the spinous processes and laminæ,—in short, of the posterior arches of the vertebral column, might have been anticipated along with the total absence of the *medulla spinalis*.* In reference to this deficiency it ought to be remarked that the development of the laminæ had proceeded pretty nearly to a completion in some of the cervical vertebræ; this development was gradually less marked towards the lower part of the column where the bodies alone existed.

Vascular System.—The heart was normal, as were all the viscera of the trunk. I need only allude to the vessels distributed upon the nervous centres, and their surrounding walls. The carotid arteries of each side, and their divisions into external and internal, were in just proportion. The complete development of the anterior and middle lobes of the brain led me to anticipate the regular size of the internal carotids, whilst the absence of cerebellum and *medulla oblongata* did not prepare me for the size of the vertebrals, which deviated very slightly from the natural standard. The occipitals were extremely large, and evidently related to the growth of the tumour; perhaps the vertebrals had been mainly distributed to the same morbid growth, which will account for their larger size.

With the exception of a partially cleft palate, the remaining parts of the face and organs of sense were perfectly developed. The thoracic, abdominal, and pelvic viscera were normal.

Nerves.—The *Sympathetic* or *ganglionic* system of nerves presented their normal characters. I carefully examined the *Cerebral* and *Spinal* nerves at their exit from the different foramina in the base of the cranium and intervertebral foramina, and on tracing them to the periphery of the body, could detect nothing irregular, either in the formation of the different plexuses, or in the anastomoses and ultimate distribution of the nerves to the muscular and other organs of the body. My attention was now directed to the central extremities of the nerves, or the positions of the nerves seen within the cranium and spinal canal. This part of the inquiry has afforded interesting results.

The *Olfactory* nerves could not be satisfactorily examined. The *Optic* nerves were flattened in form, and imperfectly developed. The central extremity of the nerve, or that which had been connected to the cerebral substance, had been removed along with the brain, but the microscopical examination of the nerve, two or three lines from the point where it penetrates the sclerotic, displayed

* This opinion is sanctioned by the labours of Geoffroy Saint Hilaire, *Philosophie Anatomique*, Paris, 1822; and Serres, *Recherches d'Anatomie Transcendante et Pathologique*. Paris, 1832.

only isolated portions of the tubulous structure of the nerve, imbedded in a quantity of fibrous tissue,—the appearance of an extremely atrophied condition of the nerve. On dissecting the parts within the orbit, each of the nerves was found distributed in the usual manner upon the muscles, &c. contained in this cavity. The third, (*motor. ocul.*); fourth, (*trochleator*); and sixth, (*abducens*) pairs of nerves could be traced backwards from the orbit through the *foramen lacerum orbitale*, along the cavernous sinus to its posterior part, where they became so extremely delicate, as to render it difficult to say that they had ever shown themselves beyond the sinus. The three divisions, and Casserian ganglion of the fifth pair were normal; the portion of the nerve on the cerebral side of the ganglion presented a short truncated appearance. The seventh, (*portio dura* and *portio mollis*); the eighth, (*glossopharyngeal, pneumo-gastric, and spinal accessory*); and the ninth pairs of Willis, and also the first, second, and third cervical nerves were hanging as loose threads in the cranial cavity, or at the junction of this cavity with that of the most superior portion of the spinal canal.* The length of these nerves, measured from their free extremities to their entrance of the foramina, through which they make their exit from the cranium and spinal canal, varied slightly from one and three-fourth inches to two and one-fourth inches; the first cervical nerve being the longest. The remainder of the spinal nerves, though visible without dissection, (the cervical being most distinct) did not hang loose in the cavity in which they were lodged. This anomalous, if not unprecedented condition† of the nerves, made me anxious to ascertain in what way the

* The free extremities looked upwards and towards the basilar process of the occipital bone. The uniformity of this direction makes it probable that this was their arrangement in the fœtus in utero.

† In conversing with my friend, Professor J. Y. Simpson, whose intimate acquaintance with the history of monstrosities is well known, regarding the unusual appearance of the nerves in this case, he kindly informed me that a somewhat similar arrangement of the nerves had been described by Lallemand some years ago. In the course of my reading, I have more than once met with references to Lallemand's case, but have not been able to lay my hands upon the original work, entitled "Observ. Pathol. propres à éclaircir quelques points de Physiologie, Paris, 1825; or his Thesis, published in 1818." M. Ollivier's reference (*Traité de Maladies de la Moelle Epinière*, Paris, 1837, p. 166,) to the case observed by M. Lallemand, distinctly indicates that it was not an anencephalous simply, but along with this malformation the spinal cord was absent. The following quotation from M. Ollivier's analysis of Lallemand's case is justifiable, since a different interpretation has been offered on the mode in which the nerves terminated by those who have had access to Lallemand's work. "A la surface de cette membrane" (M. Ollivier is speaking of the *dura mater*) "on voyait deux rangées de tubercules blanchâtres, de la grosseur d'une tête d'épingle, répondant à chaque espace intervertébral. A ces tubercules aboutissaient les nerfs du cou, du dos et des lombes. Les racines d'origine de ces nerfs avaient été détruites avec la moelle. En soulevant de chaque côté la dure-mère après l'avoir fendue, on voyait ces nerfs partir de cette membrane pour se rendre aux différents trous de conjugaison. Ceux du cou, excessivement grêles, montaient presque perpendiculairement pour passer entre les vertèbres cervicales; ils ne contenaient pas de substance nerveuse, et cependant, après avoir traversé les trous

delicate bundles, of which each nerve is composed, terminated; whether the free extremities simply marked out the separation, or breaking across of the nerves from the parts to which they had been attached, (that attachment being nervous or otherwise,) or if they were the true central terminations in the brain or spinal cord of the nerves themselves. Viewing this question as one of considerable interest, every endeavour was made to secure accurate observations. In these inquiries I had the valuable aid of my talented friend Mr Goodsir, whose microscopical investigations are too well known to require any comment here.

The whole of the nerves (hanging loose) of one side were cut across pretty close to their exit from the cranium and spinal canal, so as to obtain at least an inch of their unattached extremities. These were floated in water, and after a little adjustment, the naked eye could detect the existence of a delicate membrane or filamentous-looking tissue, which enveloped the extreme points of the nerves, and appeared to form a kind of connecting medium to these. Small portions of the nerves at the point where these entered the membrane, were placed between two pieces of glass, and on being subjected to a magnifying power of more than 300 diameters, the following facts were observed. In a highly granular-looking membrane, containing nucleated corpuscles of varied size and shape, and here and there presenting a few fibres of filamentous tissue, the bundles of nervous tubes, or the minutest fibrillæ of the nerves were distinctly seen ramifying. In a few cases, the nervous tubes were in so aggregated a form, or so imbedded in this membrane, that distinct observations could not be made on their ultimate arrangement; at other times in fasciculi so small as to consist only of two,

de conjugaison, ils avaient le volume ordinaire; ceux du dos étaient plus gros, surtout les inférieurs; ils renfermaient de la substance blanche."

Geoffroy St Hilaire (*Philosophie Anatomique*, Paris, 1822,) evidently alludes to the same case, which he calls "*L'Anencephale de l'Hotel-Dieu*," from its being born in that hospital, (*Hotel-Dieu*); and in reference to the nerves, he quotes (p. 130,) Lallemand's own words, "*tous les nerfs qui naissent du cerveau sont libres et flottans à la base du crâne*." This quotation from Lallemand's Thesis expresses the same condition as that described in the text.

Geoffroy St Hilaire describes a nearly similar case to that above, under the term "*Anencephale de la Seine*." The circumstances which led to this nomenclature are best known to himself and Madame Rignet, who had acted in the capacity of *sage femme* on the occasion. However, the case was not simply an anencephalous, but like that of Lallemand's, was deprived either in part or wholly of spinal cord. In describing the dissection and display of each of the cerebral and spinal nerves, he concludes the sentence thus: "*Mais, ce qui forme le haut intérêt de l'observation, nous aperçûmes ces nerfs écartés, isolés, entièrement libres, les uns à l'égard des autres*." The reader cannot fail to observe a great resemblance between the *anencephales de l'Hotel Dieu* and *de la Seine*. And whilst G. St Hilaire describes the nerves of the latter (*de la Seine*) as having "*ni franges, ni extrémités flottantes*," but as being lost in the tegumentary membrane, he at the same time admits the analogy of the two cases, only, however, on the supposition that Lallemand's description of the floating nerves resulted either from preconceived notions, or an imperfect state of the preparation upon which the observations were made.

three, or four tubes; and lastly, and this in the only way in which satisfactory observations could be made, the nervous tubes displayed themselves in an isolated condition or singly. Tracing any one of these tubes from the larger fasciculus of which it formed a component part, onwards to its termination,* it was observed to diverge slightly, this divergence being continued so as to form a greater or less curve, and then to turn back upon itself, gradually approaching the point from where we traced it, and forming in this manner a distinct loop, the convexity of which looked towards the free extremities of the nerve, the concavity towards the fasciculus or stem of the nerve. These loops presented a great variety in shape. At one time the nervous tube took nearly a straight course from the fasciculus, and suddenly becoming inflected, formed a loop which enclosed but a small or narrow elliptical space. At another time the space between the component parts of a loop was of considerable size, either of a horse-shoe shape, or almost circular, and not unfrequently resembling the numeral 8, from the twisting of the nervous tube upon itself.† The difficulty of distinguishing more than a few loops at a time may be easily conceived, when it is borne in mind, that, in addition to the high magnifying power, the varied curves and figures of the loops sometimes formed a kind of net-work,‡ and very frequently one part of a loop passed beneath several others; in other words, occupied a lower plane, and so became lost to view. Moreover, the existence of the granular mass, &c. (the remains probably of imperfectly developed cerebral substance,) surrounding the extremities of the nerves, mingled up with a tissue that may be considered to resemble the *pia mater*, into which the loops seemed to be dipping, rendered the demonstration at times unsatisfactory. In specimens, however, where, by repeated washing in alcohol and water, the granular matter had been in a great measure removed from the sides of the nervous tubes, the loops became very distinct, so that the doubts that had been previously entertained respecting the mode in which the nervous tubes arranged themselves in such specimens, were now dispelled. So clear was the demonstration after the granules had disappeared, that those who were altogether unaccustomed to microscopical inquiries could readily detect the existence and true character of the loops. (See Plate IV. Figures 6, 7, 8.)

Having described thus briefly the anatomical characters, it may be well to inquire how far the peculiar arrangement of the primi-

* The following pages will show that the terms "termination" and "free extremities," which I have made use of to express the extreme points of the nerves hanging loose in the cranial cavity, are not to be taken in an absolute sense.

† These facts will be better understood by referring to the figures which accompany this paper.

‡ This net-work, as we term the arrangement of the loops, must not be confounded with the terminating plexus of Valentin, or such as Burdach has figured in the skin, to which the reader's attention will presently be directed.

tive fibres of the nerves in the monstrosity will apply to the elucidation of a question, at the present day more or less canvassed by the investigators of physiological anatomy, viz. the mode in which the nerves terminate. Looking to Germany we observe that nearly the whole of her physiological talent, and this is immense, has been for several years, and still is, devoted to the investigation of the minute organization of the brain and nerves. And whilst we admire the wonderful labours of Malpighi, Leeuwenhoek, Fontana, (whose works have never been sufficiently studied,) and others of past ages, in the field of minute anatomy, it is evident that the German school of the present day is justly entitled to the palm of having discovered all the leading facts in the microscopical anatomy of the nervous system.*

The fact of the nerves consisting of cylindrical tubes, and their running parallel to each other, was pretty well known to Fontana, but not received as orthodox until the extended observations of Professor Müller, corroborated by Kronenberg in 1836, had been published. Müller announced, at the same period, the continuity of the primitive fibres from the centre to the periphery of the body, without dividing or inosculating. It then became a question how the nerves terminated. The greater number of observers directed their attention to the periphery of the body, in the hope of elucidating this question more easily than could be done in the nervous centres, and as their investigations are illustrative of some views which my own observations have inclined me to adopt, I may be permitted to glance at the results of their inquiries.

The peripheral expansion or termination of the nerves in the muscles, skin, &c., has been investigated by Rudolphi, (whose observations cannot be safely trusted,) by Prevost and Dumas,† Wagner,‡ Treviranus, Valentin, Emmert, Schwann,§ Burdach,|| and, more lately, Gerber.¶

Emmert's observations on the muscles of the frog led him to state that the primitive fibres of the nerves "run in a serpentine manner over the muscular fibres, and having described on them a larger, or smaller arch, they return to another nervous cord, or another nervous bundle, or unite with some other single primitive fibre which has just run a similar course, and accompany it to a

* The reader is referred to a very able article in the *British and Foreign Medical Review*, October 1838, on the *Structure of the Brain and Nerves*. This review, and the *Encyclopédie Anatomique*, at present in the course of publication, contain almost all the facts relative to this interesting subject.

† Magendie's *Journal de Physiologie*, Tome v. p. 144.

‡ Burdach's *Physiology*, translated into French by Jourdan. Paris, Tome vii. p. 200.

§ See *Encyclopédie Anatomique*, Tome vii.; Müller's *Physiology*, &c., for the views of Valentin, Emmert, Schwann, and Treviranus.

|| Burdach's *Contributions to the Microscopical Anatomy of the Nerves*. Quoted by Henle, *Traité d'Anatomie Generale*. French translation by Jourdan, p. 193.

¶ Gerber's *General Anatomy*. By George Gulliver, F.R.S.

nervous cord, to which they apply themselves, and in which they then go backwards to the larger nervous stems.* Treviranus and Schwann supposed that the primitive fibres terminated abruptly. It is more than probable, as Müller and Henle have suggested, that the dipping down as it were of the fibrillæ of the nerves between the muscular bundles, led these distinguished observers into error.

The description given by Burdach,† who made use of the *compressorium* in his investigations, differs not from Emmert in regard to the intricate plexus, (terminating plexus of Valentin,) by means of which is produced "a frequent interchange of primitive fibres among the twigs of the same branch or of different branches;" but, he adds, "from this plexus there come forth, lastly, at a point still nearer the end of the muscle, ramuscles, which, being resolved into single primitive fibres or bundles, of very few fibres, form arches or loops, the convexity of which look towards the end of the muscles, the concavity towards the stem of the nerve." These are the "terminating loops" of Valentin.

The terminations of the nerves in the skin have been variously described. Ehrenberg thinks the nerves lose themselves among blood-vessels, whilst Treviranus describes them as terminating in the cutaneous papillæ. The views of Treviranus are opposed by Burdach and Gluge.‡ Valentin describes the terminating loops in the skin similar to those met with in the muscular tissue. Gerber believes each papilla to contain a vascular and nervous loop. Burdach, whose observations seem to have been made with great care, is opposed to the existence of terminating loops, and believes that the primitive fibres of the cutaneous nerves can be traced from their parent stem through the cutaneous net-work,—sooner or later to join themselves to another cutaneous nerve, and, in this way, to return to the central organ.§ Breschet and Roussel de Vauzème|| at one time admit, at another time deny, the existence of nerves in the papillæ of the skin, and finally conclude that the arrangement of the nerves in the dermoid tissue is unknown.

With respect to the nerves in the other tissues of the body, it would appear from Valentin's researches, "that the nerves have, properly speaking, no peripheral termination, but that in their peripheral organs, the centrifugal part passes without any definite change into the centripetal."

In reference to the central terminations of the nerves in the brain, or rather the mode in which the "varicose fibres," (Valentin,) or "primitive cylinders," (Treviranus,) viewed as the continuation of the nervous tubes, terminate, there has been much discussion.

* British and Foreign Medical Review, October 1838.

† Loc. cit. and British and Foreign Medical Review.

‡ L'Institut, 1838, No. 232.

§ Burdach's drawing of the net-work accompanies the review in the British and Foreign Medical Review.

|| Nouvelles Recherches sur la Structure de la Peau, p. 17, 20, and 21.

Valentin states that the bundles of fibres of the brain form most beautiful and intricate plexuses, and that on the surface of the cerebrum and cerebellum, in the yellow substance, or the transition substance from the gray to the white, he saw numerous isolated loop-like terminations of the cylinders of the white mass. These "terminating loops" have been seen by Valentin in the horse and pigeon.* No one, as far as I am aware, has verified these important observations of Valentin. Professor Carus† infers the existence of the cerebral loops on physiological grounds, and hesitates not to attribute different functions to the component parts of a loop. Burdach objects to the mode in which Valentin conducted his investigations, and states that he (Burdach) never could see any such loops; at the same time, knowing the difficulty of this inquiry, he would rather not oppose his limited observations to those of Valentin. Henle‡ utters the same sentiments as Burdach, whilst Remak§ believes that Valentin has mistaken the large arches formed by the primitive fibres for terminating loops. With these statements before us, it is impossible to arrive at any opinion regarding the termination of the primitive cylinders of the brain, now acknowledged as the continuation of the nervous tubes. Those who infer from analogy the existence of cerebral loops, instance the great talents of Valentin; those who are opposed to such an arrangement cite the weighty authority of Burdach, Henle, and Remak, and so the matter has been *sub judice*.

The rare opportunity afforded by the present case offers considerable advantages over the dissections that have been made on the brain of different animals, in deciding the points of disputation in the above paragraph. The comparatively soft character of the brain, even in its freshest state, the existence of globules, &c. around the primitive cylinders, the necessity of obtaining the very thinnest section, and the use of instruments which may impair the exact character of the structures under examination, are circumstances which render the inquiry extremely difficult in the hands of the best micrographers. In the monstrosity, on the other hand, the length of the nerves, which were loose or easily isolated, and the readiness with which they hardened in spirits, were favourable circumstances,—in short, there was no difficulty presented excepting the presence of the delicate membrane, and this could generally be

* *Über den Verlauf und die Letzten Enden der Nerven von Dr G. Valentin.* (Nova Acta Physico Medica, &c., 1836, Tomus xviii. p. 92, &c.) If the reader refers to the drawings given by Valentin, (Tab. vii. Fig. 59,) he will observe that the terminating loops of the nerves, as seen in the brain of the pigeon, bear considerable analogy to the arrangement I have described and figured as occurring in the human; allowance being made for the peculiarities which different species of animals are likely to present.

† Müller's Archives, 1839, p. 368.

‡ Encyclop. Anatom. Tom. vii. p. 227.

§ Ibid. p. 228.

overcome by well arranged compression. It is a little surprising that no one had conceived the idea of investigating microscopically the nerves of monstrosities in whom the central masses were more or less deficient, for the purpose of ascertaining the termination of the nerves: the anencephalous monsters, for instance, would appear to offer favourable conditions for the inquiry, as the encephalic nerves can generally be seen running into a fungous-looking mass, or, as in others, a membrane covering the irregular and imperfectly developed base of the cranium. Impressed with these views, and desirous of testing their accuracy, I gladly availed myself, during the present summer, of the opportunity which Professor Simpson, with his characteristic kindness, had afforded me of dissecting an anencephalous foetus. In this foetus several of the nerves* were traced to the membrane, found in pretty close contact with the base of the cranium, whilst a few were free or attached in such a way that the slightest handling sufficed to make them appear as isolated threads. The microscopical examination of these nerves displayed the terminating loops, as in the previous case.

Conceiving it of greater import to be able to announce the mode in which the nerves terminate in the cerebro-spinal axis of man, I have not deemed it necessary to repeat the observations made by Valentin on the brain of the lower animals; knowing well that the object sought by Valentin in his researches on the pigeon, &c. was to promote our investigations into the human structures, where, owing to circumstances already alluded to, microscopical inquiries are beset with great difficulties. The interesting facts culled from these malformations led me to remember, and at the same time to appreciate, the remark made by Mr Lawrence,† “that we cannot fail to learn something as to the mode in which nature proceeds by attending to the imperfect sketches which she seems to have abandoned as incapable or unworthy of being completed.”

My observations have not been sufficiently numerous to allow of any decided opinion being offered as to the primitive fibres of the nerves continuing distinct from the centre to the periphery of the body, at the same time, I may state that these observations made on different nerves of the orbit to the extent of nearly three-fourths of an inch, inclined me to suppose that the component parts of each nervous loop are continued from the central organs, alongside of each other, to the tissue in which they are distributed, here, again, forming a loop, which may be called the peripheral loop. Such a view would be confirmative of the opinion propounded by Valentin, that there is no termination, properly speaking, of the nerves.

It would be injudicious at the present time to hazard any phy-

* The nerves became delicate as they approached the membrane.

† *Medico-Chir. Trans.* Vol. v. p. 170.

biological doctrines, based on the anatomical details (however curious and interesting they may appear) which I have recorded in the preceding pages. When it becomes more generally known that the nerves are tubular and contain a fluid; and when, as will shortly be the case, it is received as an established fact in anatomy, that the nerves terminate in the form of loops in the cerebro-spinal axis, and likewise at the periphery of the body, highly speculative doctrines may be expected to flow from the electro-chemical school,—a class of physiologists formerly numerous, and even now at times attractive, but who, happily for science, are gradually retreating from their position, and joining that standard which the philosophic mind of Alison, and the persevering zeal of his disciples have so firmly implanted in the field of physiology.

Teratological Remarks.—It is unnecessary to enter into any lengthened remarks on the tumour occupying the occipital region. The reddish-coloured serum was not contained in a number of cysts, as has sometimes been observed,* but in a single bag or sac.† There were no portions of nervous substances floating in the fluid, as observed in Marrigue's‡ case. I forbear noticing the development and formation of this tumour, its probable influence on the cerebral functions, together with other circumstances relative to its history, as tumours of a similar kind are frequently observed in connection with various malformations of the nervous masses.

The exact arrangement of the membranes could not be ascertained. It would appear, however, that the lining membrane of the large tumour had formed a kind of partition between the contents of the tumour and the parts below, as the imperfect spinal canal was not distended with fluid.

Cases, where the brain is absent, as in anencephalous monsters, are frequently met with.

The cases of simultaneous absence of brain and spinal cord (amy-élencéphalie of Beclard) are chiefly recorded by the older authors.§

* The existence of a number of these small bags or hydatid cysts, comprising the large tumour, has been occasionally noticed. The character of these is well illustrated in a case of *Noencephale*, dissected by Isodore St Hilaire and Martin St Angé (Histoire des Anomalies, &c. par Isod. St Hilaire, T. ii. p. 338.)

The late Dr Heysham, the highly talented physician who framed the Carlisle Bills of Mortality, relates the case of an anencephalous female child, in whom life was prolonged for six days, and where a large excrescence, occupying the upper part of the deficient cranium, continued to discharge a thin watery fluid, sometimes tinged with blood during the three or four days preceding her death. This discharge proceeded from the rupture of several small cysts scarcely as large as a nutmeg, the walls of which probably ulcerated and reduced the tumour to nearly one-half its original size. For other circumstances relative to this interesting case which occurred in 1788, see *Memoirs of the Manchester Lit. and Philos. Soc.* Vol. v. part ii. page 496.

† See a case related by Collins, *Practical Midwifery*, p. 511.

‡ *Journal de Med. Chirurg. Pharm. Supplém.* à l'année, 1770. T. xxxiv. p. 53.

§ (De Sed. et Caus. Morb. Epist. 12, 8, &c. Morgagni speaks of Fontanus, Hoffman, Vanhorne, &c. having met with such cases; also Valsalva. In France, Littre, Fauvel, Mery, Burgoin, and more lately Andral, (*Arch. Gen. de Med.*, 1826, p. 636,) say they have dissected such cases.

In none, excepting two related by Fauvel and Mery, was life said to be manifested, and, from circumstances to be noticed under the "medico-legal remarks," they cannot be received as authenticated proofs of living amyelencephalous monsters.

The absence of spinal cord (amyelie of Beclard) has been observed by Rusch, Anselin, Malacarne, &c., but as M. Ollivier,* who quotes these cases, will not admit of the existence of an encephalon where the spinal cord is wanting, it may be supposed that in each of these cases there was no portion of the cerebro-spinal axis. That, along with the absence of spinal cord, we may expect a deficient encephalon, if not other considerable deviations in the economy, is fully illustrated in the history of monstrosities, at the same time, I humbly conceive that it would be hasty to infer, as M. Ollivier has done, the absence of encephalon in all cases where the *medulla spinalis* is wanting. The great frequency of the anencephalous monsters has appeared sufficient proof to many of the development of the encephalon being secondary to that of the spinal cord, and doubtless this is the general opinion on the subject. It may, however, be observed that the knowledge which we at present possess of the development of the nervous centres is not so complete or well determined, as to enable us to lay down positive laws regarding the priority of formation of any division of the cerebro-spinal axis. Two cases of absence of spinal cord are noticed by Morgagni,† and have been copied by him from Rayger.‡ They are thus described: "Mihi enim ex binis Caroli Raygeri, observationibus bene pensitatis videtur in duobis maturis fœtibus cerebrum quidem maxime deformatum, sed non destructum fuisse, cum in utroque *spinalis medullæ esset nulla*, aut certe nil nisi sanguis concretus, aut sanguini concreto simile." Whilst we admit the plausibility of the objections urged by M. Ollivier against such observations, where the facts are so briefly stated, there is this much to be said in favour of Rayger, that coagulated blood could hardly be confounded with medullary matter. Whether Rayger has reported the circumstances correctly or not, the monstrosity, whose history I am recording, sufficiently demonstrates the absence of a spinal cord, even where the encephalon was almost wholly developed.

I have in vain searched in the history of monstrosities for an individual case to which the one under consideration might be linked. Multifarious and remarkable as are the malformations of the nervous system, whether these consist in an excess or deficiency, no instance has offered itself where the absence of the spinal cord, medulla oblongata, and cerebellum, was associated with an almost perfect brain. The authorities on this subject, Meckel, Beclard,

* *Traité des Maladies de la Moelle Epiniere*, p. 165.

† *De Sed. et Caus. Morb. Epi-t.* xii. art. 10, p. 91.

‡ *Eph. Nat. Cur.* Dec. i., A. 3, and 64 A. 8.

Geoffroy St Hilaire, &c. have not attempted to classify an anomaly of this kind. Such never having occurred in history, there was no necessity for anticipating "freaks of nature;"* whilst not a few, along with M. Ollivier, deny the possibility of such malformations ever being developed.

The absence of a spinal cord entitles the case I am recording to be placed in the *Amyelia* of Beclard, but as the encephalon was imperfect with slight deficiency of cranium and protrusion of the posterior lobes into an hydrocephalic expansion, an *additional* term is required, and perhaps that of *Hydrencephalocoele* is the most applicable, and if necessary to have one term *Hydrencephalocela-myelia*.

Medico-Legal Remarks.—The circumstances involved in the judicial inquiry instituted on this case, may be discussed under two queries; 1. Had the child breathed? 2. Were the anormal conditions which the foetus manifested compatible with life?

In reference to the first of these questions, it may be stated that the lungs sank in water, no air could be pressed out of cut portions under water, and their specific gravity, either when entire or divided, seemed much the same as that of so much liver. The *foramen ovale* of the heart was quite patulous, as also the *ductus arteriosus*, both of which had evidently undergone no change from the true foetal condition. These circumstances afforded sufficient evidence that the child had not breathed.†

The second question was most judiciously responded to in the negative. Dr Oliver stated without any reserve, that in the absence of the spinal cord, and especially that part to which the nerves of respiration are attached, it was impossible that the child could maintain an independent existence. Our present knowledge of the nervous system fully warranted this opinion, nevertheless it is well to be aware that cases of an opposite tendency are recorded, and that these are sometimes adduced as proofs that the nervous centres are not essential to the maintenance of life

* In using the term "freaks of nature," I do not for a moment suppose that the God of Nature is pleased to create organized beings irregular and deformed, but heartily concur in what has been elegantly stated by Chaussier and Adelon, who, after recounting numerous facts relating to the causes of monstrosities in the organized world, conclude thus: "Tous ces faits nous semblent établir que les germes des animaux et des végétaux sont émanés purs et réguliers de la main du Créateur; enfin, que toute difformité ou monstruosité sont subéquentes et résultent de divers choos ou dérangemens, ou de l'inégale nutrition, etc, de ces mêmes germes." Dictionnaire des Sciences Médicales, 1819, Tome xxxiv. p. 140.

† The numerous cases lately adduced by Mr Taylor of London and Dr Geoghegan of Dublin, (Guy's Hospital Reports, Vols. v. and vii.) and Dr Joerg, (De Morb. Pulmon. Organico, ex resp. Neonator imperfecto: quoted in Dub. Journ. Vol. v. p. 36. ;) and Nicolai, (Brit. and For. Review, July 1843,) &c. ought to be well attended to before the medical man ventures upon a decided opinion in cases of infanticide where the evidence rests in a great measure on the state of the lungs. The medical witnesses in this case had been well aware of the importance of the inquiry as shown in the text.

for a short period. Let us inquire into the validity of these cases. M. Fauvel, in 1701, showed the French Academy of Sciences a *foetus* without brain, cerebellum, or spinal cord, but in other respects well-formed and at the full time, which lived two hours, and gave signs of feeling when the water of baptism was sprinkled on its head. The following quotation, which in length exceeds the description given of the *foetus* itself, tends to show that the case was not a solitary instance of absence of the nervous centres, so damnatory to the hypotheses then taught in the schools of animal spirits regulating the different vital processes. “Ce n'est par la premiere fois que l'on a vu ce fait, donc on tire une terrible objection contre les *Espirit-Animaux*, qui doivent s'engendrer dans le cerveau, ou tout au moins dans la *Moelle de l'épine*, et que l'on croit communement si necessaires à toute l'economie animale.”* M. Mery† in 1712, reported a more extraordinary case to the same Academy, of a male child born at the full time without brain or spinal cord, which lived twenty-one hours and took some nourishment. It is added that several parallel instances have been reported, but the references are not given. No one can peruse the history of MM. Fauvel and Mery's cases, without being struck with the extreme brevity of the description; no mention being made of the condition of the nerves of the cerebro-spinal and sympathetic system, or of the form and characters of the cranial and spinal cavities. Numerous other omissions of an important kind sufficiently indicate the extreme carelessness of the description. We must also bear in mind that the above cases occurred at a time when anatomical observations were less accurate and precise ‡ than at the present day, and when vague and hastily formed hypotheses, rather than a close scrutiny of physiological phenomena, occupied the minds of the profession. Moreover, other circumstances, which it is not easy to conjecture at this distant period, may have misled the authors,—and the probability of any, or perhaps all of these sources of error prevailing, is calculated to render us very sceptical as to the character of the cases being such as Fauvel and Mery have reported them. In 1730, or about that period, M. Belgrand described a *foetus* of eight months, which lived four hours without encephalon and spinal cord. A tumour with serum occupied the upper part of the neck.

* *Histoire de l'Acad. Roy. des Sciences*, 1711, p. 13.

† *Ibid.* 1712, p. 51.

‡ Detharding, his son, along with Alban, describe a case in the *Nov. Act. Nat. Cur.* x. part ii. p. 703, where the spinal cord was absent. The only proof they give of this was the introduction of a sound into the spinal canal! M. Rouant, by employing the same means of exploration, was led to believe in the absence of the spinal cord;—a more correct investigation of the canal displayed a spinal cord somewhat less than the normal size! (*Histoire de l'Acad. des Sciences*, pour 1713, p. 20.) Such cases strikingly exhibit the mode in which anatomical inquiries were pursued, and at the same time confirm the accuracy of the opinions expressed in the text.

It is well remarked by M. Ollivier,* that as the spinal canal does not appear to have been opened below the fourth cervical vertebra, we cannot look upon the case as proving the absence of spinal cord. Another century had elapsed, and though numerous cases of monstrosity, exhibiting marked deficiencies in the central masses of the nervous system were met with at home and abroad, leading to various and highly speculative inquiries as to the purposes fulfilled in the economy by the brain and spinal cord respectively, no single instance occurred where life was sustained for a time without nervous centres, and physiologists had either forgotten the history of, or determinedly set aside as unworthy of trust the cases reported by Fauvel and Mery. In 1833, however, the profession in this country were startled by the announcement that Spessa, an Italian surgeon, had described a child wanting the encephalon and *medulla oblongata*, which had lived eleven hours. A careful perusal of the case† will convince the reader that the greater part, if not the whole, of the *medulla oblongata* was present. Spessa does not mention how the nerves distributed on the organs of circulation and respiration terminated above, or whether or not they were connected with the mammillary portion described at the summit of the spinal cord. Such omissions render the history of Spessa's case very incomplete. The more closely we examine into the details of the cases just alluded to, the more convinced are we that it would be unsafe to infer that any such important phenomenon in the chain of life as that of respiration could be manifested in the absence of a nervous centre, to which the impression *besoin de respirer* could be conveyed.

* *Traite de la Moelle Epiniere*, p. 164.

† The "*Lancet*," (January 26, 1833), in quoting the case from the *Gazette Medicale*, Janvier 15, 1833, as "important and extraordinary," &c. has been a little incautious, as the following extract from their own translation, shows. "Behind the neck arose a nipple-like protuberance, resembling pretty closely the extremity of the little finger." * * * The touching of this prominence invariably occasioned an acceleration of the respiratory movements, &c. * * * The spinal cord had its origin from this protuberance, and entered the rachidian canal by an opening situated behind, *between the base of the skull and the atlas*." Why should Spessa speak of the "rachidian cord and cord itself" if the spinal cord alone had been present.

The *Lancet* remarks on the case, "it is sufficient for us to mark the all-important physiological fact of the carrying on of the respiration, and the movements of the larynx without the influence of the brain, cerebellum, or *medulla oblongata*." It is to be hoped the distinguished Editor does not adhere to these doctrines in his present capacity of coroner for Middlesex.

Description of the Figures. Plate IV.

Fig. 6. A washed specimen, exhibiting the simple loops divested of granular matter; the interior of nervous tube containing granules.

Fig. 7. Loops of varied figure; the nervous fasciculus or stem to which they belong is obscured by the granular matter.

Fig. 8. A figure of 8 loop distinct, and a portion of a second loop running in close contact with one side of it and then diverging, is lost in the granular matter; a third passing beneath the two former, and lost to view in the same way. (Magnifying power above 300 diam.)

ART. VII.—*Statistics of Eight of the principal Civil Hospitals in Scotland, prepared from the Managers' Printed Reports, and other authorized Documents.* By J. THOMSON, Esq. *With observations by the Editor.*

TABLE A.—*Vital Statistics.*—Showing the number of patients treated; the average residence in hospital; the deaths and ratio of mortality per cent., with the proportion of deaths to cures, &c.

Hospitals.	1. Pop. of respective towns in which the hospitals are situated. Census 1841.	2. Period one year, ending	3. Under treatment during the year.	4. No. of cases treated to a termination.	5. Died.	6. Cured.	7. Relieved and discharged.	8. Disch. from other causes, viz. by desertion, irregular and improper, no benefit.	9. Average daily number in hospital.	10. Days in hospital for each cure.	11. Aver. residence in hospital in days.	12. Ratio of deaths per cent. of cases terminated.	13. Ratio of cures per cent. of cases terminated.	14. Proportion of deaths to cures.	15. Days of residence in hospital for 1 death.	16. Ratio of admission per cent. of the population.
Royal Infirmary, Edinburgh,	164,451	Oct. 1, 1842.	3770	3529	443	2255	551	280	303	41	29	12.55	63.89	1 to 5.09	249	2.3
... Aberdeen,	64,767	Dec. 31, 1842.	1956	1922	83	1458	167	112	113	28	21	4.66	80.02	17.15	481	3.0
... Dumfries,	13,353	Nov. 11, 1842.	508	463	29	352	44	38	41	42	29	6.26	76.02	12.14	516	3.8
Infirmary, Montrose,	13,811	June 1, 1842.	324	295	20	258	7	10	23	32	26	6.77	87.45	12.90	419	2.3
Royal Infirmary, Glasgow,	278,147	Dec. 31, 1842.	3612	3405	328	2646	226	205	228	31	23	9.63	77.70	8.06	254	1.3
... Dundee,	63,825	June 1, 1842.	916	882	45	762	62	23	52	25	21	5.10	86.39	16.93	422	1.4
Northern Infir. Inverness,	11,692	Dec. 31, 1842.	385	344	15	237	41	51	38	59	36	4.36	69.00	15.80	925	3.3
County & City Infir. Perth,	18,281	Dec. 31, 1842.	486	424	29	305	34	56	42	50	31	6.81	71.93	10.51	536	2.7

TABLE B.—Statistics of Expenditure as regards diet, medicine, &c.

Hospitals.	Period one year, ending	Under treat- ment during year.	Daily av. No. of pat. in hospital.	1.	2.	3.	4.	5.	6.
				Bread, biscuit, and flour.	Oat, barley, & Milk and pease-meal.		Butcher-meat, poultry, hares, cheese, ham, tables, and fish, and gro- ceries.	Tee, coff. eggs, sugar, butter, potatoes, ve- getables, ham, tables, and fish, and gro- ceries.	Pot-barley, potatoes, ve- getables, and other articles of food
Royal Infirmary, Edinburgh.	Oct. 1, 1842.	3770	303	L.936 19 2½	L.233 1 0	L.848 17 6	L.944 10 9½	L.461 0 6½	L.147 19 9
Aberdeen.	Dec. 31, 1842.	1956	113	*	...	...	...	...	829 5 2
... Dumfries,	Nov. 11, 1842.	508	41	80 8 1½	41 17 6	87 10 6	63 13 11½	82 7 1½	6 0 0
Infirmary, Montrose,	June 1, 1842.	324	28	44 16 3	16 15 0	32 8 8	30 14 8	28 19 1	9 17 10
Royal Infirmary, Glasgow,	Dec. 31, 1842.	3612	228	375 8 3	130 19 3	277 9 10	507 2 3	281 0 1	114 17 8
... Dundee,	June 1, 1842.	916	52	150 0 6	17 0 0	80 0 0	100 13 0	142 7 6	186 17 0
Northern Infirmary, Inverness,	Dec. 31, 1842.	385	38	92 13 1½	39 14 0	...	116 19 0	116 3 9	7 12 8
City & County Infirmary, Perth,	Dec. 31, 1842.	486	42	112 14 2	37 12 0	69 2 10	91 18 2	92 11 6	...

* The expenditure for provisions is all entered in one sum.

TABLE B.—Statistics of Expenditure, *continued.*

Hospitals.	7. Medicines of all sorts.	8. Surg. instrum., bandages, and articles for the apothecaries' shop.	9. Salaries of medical officers and clinical lecturers.		10. Salaries of non-medical office-bearers.	11. Wages of nurses, porters, ale, porter, victuaria.	12. Wine, spirits, porter, ale, negar.	13. Advertising.		14. Stationery and printing.
Royal Infirmary, Edinburgh,	L. 417 17 4½	L. 224 12 1½	L. 198 3 0	L. 456 6 9	L. 892 6 8	L. 483 18 2	L. 345 5 8			
... Aberdeen,	114 3 3	35 18 6	295 19 0	105 0 0	261 0 2*	72 15 0	43 12 6			
... Dumfries,	104 15 0	4 8 4	126 0 0	62 11 0	95 3 3½	13 14 6	22 9 5			
Infirmary, Montrose,	25 0 2	...	60 0 0	...	39 0 0	...	...			
Royal Infirmary, Glasgow,	234 0 2	164 1 0	629 10 6	415 0 0	806 6 4	165 5 2	107 18 0			
... Dundee,	174 11 9	8 16 0	264 9 0	...	5 15 0	32 3 5	8 12 0†			
Northern Infirmary, Inverness,	71 7 3	..	30 0 0	5 0 0	79 10 0	61 19 9	5 5 6†			
County & City Infirmary, Perth,	160 5 5	...	100 0 0	55 0 0	183 8 11	71 6 11	10 17 6†			

* Includes L. 48, 0s. 2d. for washing.

† These sums are entered in cumulo.

TABLE B—Statistics of Expenditure.—Continued.

Hospitals.	Daily average No. of patients in hospital.	15.	16.	17.	18.	19.	20.
		Heating and Lighting.	Repairing furniture and Furnishings.	Miscellaneous Expenses.	Total Ordinary Expenditure.	Fee-duties, Annuities, and Interest.	Buildings, Alterations, and Repairs.
Royal Infirmary, Edinburgh,	303	L.568 14 5½	L.430 4 1	L.226 11 2	L.7834 17 9½	L.543 2 10	L.887 10 6
... Aberdeen,	113	164 15 8	77 8 3	86 5 9	2086 3 3	...	62 6 2
... Dumfries,	41	70 14 2½	189 4 1½	13 1 10	1063 18 11½	8 15 4½	168 11 6
Infirmary, Montrose,	23	22 0 8	64 15 4	15 10 6	379 18 2	21 13 3	44 3 6
Royal Infirmary, Glasgow,	228	363 10 10	398 13 10	375 18 8	5407 17 3	...	534 19 0
... Dundee,	52	60 15 0	21 1 6	14 1 11	1297 3 7	...	72 11 3
Northern Infirmary, Inverness,	38	37 1 4	24 15 7	14 12 6	708 13 5½	30 0 0	59 1 2
County & City Infirmary, Perth,	42	106 9 8	85 10 3	37 16 0	1244 13 4	7 0 5	...

TABLE B.—Statistics of Expenditure.—Continued.

Hospitals.	Under treatment during the Year.	Daily av. No. of patients in hospital.	21.			Yearly av. expense of each occupied bed, for provisions, as per columns, 1, 9, 10, 11, 2, 3, 4, 5, 6, 12.			Average yearly expense of each patient, as per column 18.			Average cost of each patient for the grand total expenditure, as per column 21.			Daily cost for ave. cost of each patient		
			L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.
Royal Infirmary, Edinburgh,	3770	303	9266	11	1½	11	15	1½	8	16	6	25	17	1½	30	11	7
... Aberdeen,	1956	113	2148	9	5	7	6	9½	7	16	7	18	9	2½	19	0	3
... Dumfries,	508	41	1241	5	9½	8	16	6	9	18	4	25	19	0	30	5	6
Infirmary, Montrose,	324	23	445	14	11	7	2	3	5	7	10	16	10	4½	19	7	7½
Royal Infirmary, Glasgow,	3612	338	5943	16	3	7	11½	10	14	4½	23	14	4½	26	1	3½	0
... Dundee,	916	52	1369	14	10	13	0	4	9	6	10	24	18	10½	26	6	9½
Northern Infirmary, Inverness,	383	28	797	14	7½	9	12	1½	6	10	4½	18	13	0	20	19	10½
County & City Infirmary, Perth,	486	42	1251	13	9	9	12	4½	13	11	5½	22	12	6½	29	16	0½

Supplement.—TABLE B, No. 1.—Statistics of Expenditure.

Particulars of ann. expend. Tab. correspond. to each patient. B.	Edinburgh.	Aberdeen.	Dumfries.	Montrose.	Glasgow.	Dundee.	Inverness.	Perth.	Average cost.
Bread, biscuit, flour,	L. s. d. 3 1 2½	L. s. d. 7 6 9½	L. s. d. 1 19 2½	L. s. d. 1 18 1	L. s. d. 1 12 11½	L. s. d. 2 17 8½	L. s. d. 2 3 5½	L. s. d. 2 13 8½	L. s. d. 2 13 8½
Oat, barley, and pease meal,	0 15 4½		1 0 5	0 14 6	0 11 5½	0 6 6½	1 0 10½	0 17 10½	0 17 10½
Milk and small beer,	2 16 0½		2 2 8½	1 8 1½	1 4 4	1 10 9	...	1 12 11	1 12 11
Butch. mt. ptry. hares, rab.	3 2 4½		1 11 1	1 6 8½	1 4 7½	1 18 9	3 1 12	2 3 9½	2 3 9½
Tes, cof. eggs. sug. but. groc.	1 10 6½		2 0 2	1 5 10	2 4 5½	2 14 9	3 2 7½	2 4 1	2 4 1
Pot-bar. potatoes, vegetables,	0 9 8½		0 2 11	0 9 0½	0 10 1½	3 11 10	0 4 0½	...	...
Medicines,	1 7 7½		2 11 1	1 1 8½	1 0 6½	3 7 12	1 17 6½	3 16 3½	3 16 3½
Surgical instruments, &c.	0 14 10½		0 2 2	...	0 14 4½	0 3	...	...	...
Salaries, medical officers, &c.	0 13 1		0 2 2	2 12 2	2 17 10	5 1	0 15 9½	2 7 7½	2 7 7½
Salar. non-med. office-bears.	1 10 1½		1 10 6½	...	1 16 4½	...	0 2 7½	1 6 2½	1 6 2½
Wages, nurses, porters, &c.	2 18 11½		2 6 5	1 13 11½	3 10 9½	0 2 2½	2 1 10	4 7 4½	4 7 4½
Wines, spirits, port. vinegar,	1 11 10½		0 6 8½	...	0 14 6½	0 12 4½	1 12 7½	1 14 0	1 14 0
Advertising,	0 1 11		...	...	0 2 8½	0 3 3½	0 2 10½	0 5 2	0 5 2
Stationary and printing,	1 2 9		0 10 11	...	0 9 5½	0 11 6½	0 7 3½	0 14 3	0 14 3
Heating and lighting,	1 17 6½		1 14 5	0 19 1½	1 11 10½	1 3 4½	0 19 6½	2 10 8½	2 10 8½
Repairing. furnit. furnishings,	1 8 4½		4 12 3	2 7 7½	1 14 11½	0 8 1½	0 13 0½	2 0 8½	2 0 8½
Miscellaneous expenses,	0 14 11½		0 6 7	0 13 6½	1 13 0	0 5 5	0 7 8½	0 18 0½	0 18 0½
Aver. ordinary expenditure,	26 17 12½	18 9 2½	26 19 0	16 10 4½	23 14 4½	24 18 10½	18 13 0	29 13 8½	23 19 4
Few-dut. annuities, interest,	1 15 10	...	0 4 3	0 18 10	...	...	0 15 9	0 3 4½	0 3 4½
Building, alteration, repairs,	2 16 7½	0 11 0½	4 2 3	1 16 5	2 6 11	1 7 11½	1 11 1½	...	...
Yrly. expense of each patient,	30 11 7	19 0 3	30 5 6	19 7 7½	26 1 3½	26 6 9½	20 19 10½	29 16 0½	25 6 1½

SUPPLEMENT.—TABLE B, No. 2.—Statistics of Expenditure.

Particulars of salaries, wages, and allowances.	Edinburgh. Erected 1736.		Aberdeen. Erected 1739.		Dumfries. Erected 1776.		Montrose. Erected 1780.		Glasgow. Erected 1794.		Dundee. Erected 1795.		Inverness. Erected 1808.		Perth. Erected 1837.	
	L.	s. d.	L.	s. d.	L.	s. d.	L.	s. d.	L.	s. d.	L.	s. d.	L.	s. d.	L.	s. d.
Physician,	...	...	} 255 0 0	40 0 0	40 0 0	...	...	...	150 0 0	...	} 270 4 0	...	...	...	60 0 0	...
Surgeon,	...	...		50 0 0	50 0 0	...	60 0 0	...	12 0 0	...		...	...	...	...	...
Apothecary,	70 0 0	...		...	...	...	...	...	5 0 0	...		...	...	...	...	...
Assistant-apothecary,	57 2 0	...	...	...	...	...	...	...	...	...	} 294 10 6	...	...	...	...	...
Cupper,	21 0 0	...	...	...	...	...	...	...	...	...		...	...	...	...	...
Clinical lecturers,	...	...	40 19 0	...	...	...	...	...	20 0 0	...		...	...	...	...	...
Superintendent or house-governor	80 0 0	...	...	36 0 0	...	...	...	...	294 10 6	...	} 185 0 0	...	...	...	...	...
Treasurer,	60 0 0	...	...	30 0 0	...	...	...	...	185 0 0	...		30 0 0	...	...	40 0 0	...
Clerk or secretary,	50 0 0	...	} 105 0 0	...	...	...	...	...	...	...		...	...	...	10 0 0	...
Matron,	80 0 0	...		16 16 0	...	...	...	...	50 0 0	...	} 50 0 0	...	...	...	10 0 0	...
Chaplain,	60 0 0	...		15 15 0	...	...	...	...	50 0 0	...		...	...	...	35 0 0	...
Assistant-chaplain,	5 0 0	...	...	...	...	...	...	...	...	...		5 0 0	...	...	...	...
Precentor,	5 5 0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Collector,	65 5 9	...	...	...	...	...	...	...	80 0 0	...	...	...	...	...	...	...
Accountant,	30 0 0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
For Statistical tables,	10 0 0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
For extra writing,	40 16 0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Servants, porters, nurses,	892 6 8	...	281 0 2	95 ...	3 34 ...	...	39 0 0	...	806 6 4	...	...	79 10 0	...	...	183 8 11	...
Table B.—No. 9, 10, 11.	L. 1546 15 6	...	L. 621 19 2	283 14 34	...	...	99 0 0	...	L. 1880 16 10	...	L. 270 4 0	...	L. 114 10 0	...	338 8 11	...

Note.—Edinburgh. The salary of L.100 to one physician has been discontinued since the death of the last incumbent. The salary of the superintendant, or house-governor, is L.80 per annum.

Montrose.—This town is divided into six districts for dispensary practice, and one surgeon placed in charge of each, with a salary of L.10.

Dundee is divided into districts, with a surgeon in each for dispensary practice, but their salaries are not separately stated.

Perth is divided into districts for dispensary practice, with a surgeon in charge of each. Two receive salaries of L.20 each, and two L.10 each, per annum.

In Montrose, Dundee, and Perth, the dispensary practice appears to be well regulated. The sick are visited, &c., by the surgeon of their district, (not allowed to go from one dispensary to another;) every case is recorded, and the result reported to the Managers of the Infirmary, and published annually.

Table of Observations on Vital Statistics.

Col. 1. Shows the number of the population in the different towns according to the census of 1841. The population assigned for Edinburgh includes Leith.

Col. 2. The period comprehended in this table is only one year, and as the hospitals do not make up their annual returns so that the period should terminate at the same day, it has been necessary to specify the day upon which the year ends in each establishment.

Col. 3. This column includes the cases remaining at the end of the former year, together with the numbers admitted during the annual period.

Col. 4. This column shows the number of cases under treatment during the year,—minus the numbers remaining in hospital at the end of the year.

Col. 5. Shows the number of deaths during the annual period.

Col. 6. The number of cures or recoveries.

Col. 7. This column requires no explanation.

Col. 8. The purport of this column is obvious.

Col. 9. This column is of much importance in financial calculations. It shows the mean, or average daily number of patients in hospital,—which alone controls the expenditure.

Col. 10. This column shows the mean number of days of residence in hospital for each recovery. It is computed by dividing the days of residence by the number of cures, and the quotient, or number produced, shows the relation of sick time to each recovery. The range in this column is very considerable, namely,

from 25 days in Dundee to 59 days in Inverness. To what circumstance is the above result to be attributed?

Col. 11. Shows the average residence of patients in hospital, the range being from 21 days in the Aberdeen and Dundee hospitals, to 36 days in the hospital at Inverness. In Edinburgh it will be observed that the mean residence is 29 days, or one-fourth longer than the residence in the Glasgow hospital.

Col. 12. Shows the ratio of mortality among the patients whose cases have terminated. The range of mortality being from 4·36 per cent. in Inverness to 12·55 in Edinburgh,—or 1 in 8. How are we to account for the wide range of mortality in these eight hospitals? The subject is one of much importance and calls for careful investigation.

Col. 13. Shows the ratio of cures or recoveries among the patients whose cases have terminated, the range being from 63·89 per cent., in the Royal Infirmary of Edinburgh, and 87·45 in the Montrose Infirmary. In the Glasgow Hospital the cures are 14 per cent. higher than in Edinburgh.

Col. 14. Shows the proportion of deaths to cures. The greatest number of cures to 1 death is 17·15 in the Aberdeen Hospital, and the least 5·809 in Edinburgh, showing a difference of 334 per cent. How is this difference between the deaths and recoveries in these hospitals accounted for?

Col. 15. This column indicates the average number of days of sickness, or residence in hospital which occurs for one death. It is found by dividing the days of treatment by the number of deaths. Here the range extends from 249 in Edinburgh to 925 in Inverness.

Col. 16. Shows the ratio of admission per cent. of the population of the town in which the hospital is situated, the range being from 1·3 in Glasgow to 3·8 in Dumfries.

These numerical results, founded upon data which cannot be disputed, deserve to be critically investigated, not only by gentlemen of the medical profession but by philanthropists who wish to promote the happiness and the welfare of their fellow-citizens.

Observations on the Expenditure.

The observations on Vital Statistics, Nos. 1 and 2 apply here.

The third column shows the mean, or average daily number of patients in hospital. This forms a most essential statistical element as a check upon the expenditure. It may be determined by counting the patients every day in the year at the same hour, and dividing the sum by 365.

In some of the accounts the details of the expenditure are abridged,—various articles being added together and entered *in cumulo*. In the Aberdeen Report of last year, the bread, meal,

groceries, vegetables, and all other articles of food are entered Provisions, L. 829, 0s. 2d. This form of rendering an account precludes any comparison of the different articles used in other institutions.

Col. 1. Shows the expenditure of each hospital for bread, biscuit, and flour, and the supplement No. 1 shows the sum applicable to each occupied bed. In the Glasgow Infirmary the yearly cost of the bread of each patient is L.1, 12s. 11½d., and in Edinburgh, L.3, 1s. 2½d.

Col. 2. This column shows the disbursement for oat, barley and pease meal. It ranges between 6s. 6½d. in the Dundee Hospital, and L.1, 0s. 10½d. in the hospital at Inverness.

Col. 3. Shows the cost of milk and small beer. In the Glasgow Hospital the charge is L.277, 9s. 10d. or L.1, 4s. 4d. for each occupied bed, and in the Edinburgh Hospital, L. 848, 17s. 6d. or L. 2, 16s. 0½d. for each occupied bed.

Col. 4. Shows the expenditure for butcher-meat, poultry, hares and rabbits; each occupied bed in Glasgow Infirmary costs L.1. 4s. 7½d.; and in Edinburgh, L. 3, 2s. 4½d.*

Col. 5. The expenditure for tea, coffee, eggs, milk and groceries is shown in this column. Each person's portion of the cost ranges between L. 1, 5s. 10d. in the Infirmary of Montrose, and L.3, 2s. 7½d. in the Hospital at Inverness.

Col. 6. This column shows the cost of pot-barley, potatoes, vegetables, and other articles of food. (In the Aberdeen Report the amount of all the foregoing articles is entered under this head, and cannot be compared here.) In the Dumfries Hospital the charge is 2s. 11d., and in Dundee, L.3, 11s. 10d.

Col. 7. Shows the cost of medicines of all sorts. The charge under this head in the County and City Infirmary Perth, is L.3, 16s. 3½d., and in the Glasgow Hospital, L.1, 0s. 6½d. for each occupied bed. The drugs used in the dispensary practice of both cities is likely included. The number of patients treated during the year 1842, at the Glasgow Dispensary, was 4649; and at the Perth Dispensary, 547.

Col. 8. This column embraces the expenditure for surgical instruments, bandages, and articles for the apothecary's shop,—the sum corresponding to each occupied bed range between 2s. 2d. in the Hospital at Dumfries; and 14s. 10½d. in the Edinburgh Infirmary. An entry of L.35, 6s. 6d. for bottles and glass in the latter hospital, indicates probably an enlargement of the Institution.

Col. 9, 10, 11. Shows the expenditure under the heads sa-

* The whole food of an inmate of the West Church Workhouse in that year cost L.3, 16s. 0½d. (*Managers' Ninth Report, page 27.*)

salaries to medical and non-medical office-bearers, and wages of nurses, porters, and female servants. A more detailed statement of these charges is shown in the supplement No. 2. In some of the reports these disbursements are entered *in cumulo*. In the Edinburgh and Glasgow reports each salary is entered separately; the total charge under these heads for each occupied bed, ranges between L. 3, 0s. 3d. in the Northern Infirmary at Inverness, and L. 8, 5s. in the Royal Infirmary, Glasgow.

Col. 12. This column shows the cost of wine, spirits, ale, porter, vinegar. There is no charge under this head at Montrose; at Dumfries, L. 13, 14s. 6d., or 6s. 8½d. is charged; at Perth Infirmary the charge is L. 1, 14s. for each occupied bed.

Col. 13. Shows the expenditure for advertising.

Col. 14. Shows the amount paid for stationery and printing. The charge under this head in the Glasgow Infirmary report is L. 107, 18s, equal to 9s. 5½d. for each occupied bed. In Edinburgh the charge is L. 345, 5s. 8d., equal to L. 1, 2s. 9d. for each occupied bed. *

Col. 15. Shows the amount expended upon heating and lighting the several hospitals.

Col. 16. Shows the cost of furnishings and repairing furniture.

Col. 17. This column contains the sum of all miscellaneous charges, not otherwise described and entered.

Col. 18. This column is the sum of all the preceding columns, or total ordinary expenditure.

Col. 19 and 20. Shows the feu-duties, annuities, interest, and heritable disbursements.

Col. 21. This column is the sum of all the other columns, or grand total expenditure.

Col. headed yearly average expense, per Col. 1 to 6. This column shows the average cost of the food of one patient in each of the hospitals. The charge is L. 7, 2s. 3d. in Montrose, and L. 13, 0s. 4d. in Dundee. How is this? both towns are situate in the same county, and not more than thirty miles distant from each other.

Col. headed yearly average expense, per Col. 7 to 12. This column shows the yearly cost of drugs, surgical instruments, wine, spirits, malt liquor, salaries and wages,—what may be called the medical and surgical expense. In the Montrose Infirmary these charges amount to L. 5, 7s. 10d.; and in the Perth Infirmary to L. 13, 11s. 5½d. to each occupied bed.

Col. headed average yearly expense of each patient, per col.

* During the late war the government allowance of L. 56 a year for the postage and stationery of a regiment was said to be most extravagant.

18. This column shows the yearly cost of one patient, (exclusive of interest and heritable outlays.) In the Montrose Hospital each occupied bed costs L. 16, 10s. 4½d. In the Perth Infirmary L. 29, 12s. 8½d. This difference in expense depends on various detailed circumstances which cannot be known or thoroughly understood without careful personal examination.

Col. headed average yearly expense, &c., per col. 21. This column indicates the cost of each patient upon the total expenditure. This ranges between L. 19, 0s. 3d. in the Royal Infirmary of Aberdeen, and L. 30, 11s. 7d. in the Royal Infirmary of Edinburgh : a difference of L. 3504, 14s. upon the maintenance, &c. of 303 patients.

How this is to be accounted for is difficult to say. Neither the recovery of the patients, nor the efficiency and usefulness of the Aberdeen Infirmary, appear to be affected by the saving. See table of vital statistics, columns Nos. 11, 12, 13, 14, and 16.

Two columns headed average cost of each patient. The four preceding columns refer to yearly expenses. These two columns show the cost of each admission to hospital, without regard to residence. Every patient who is admitted to the Royal Infirmary of Edinburgh costs L. 2, 9s. 1½d., and each patient admitted into that of Aberdeen costs L. 1, 1s. 11½d. annually.

Col. headed daily average cost, per column 18. This column shows the daily average cost of one patient in each of the eight hospitals, viz. 10½d. in Montrose, and 1s. 7d. in Perth.

Appendix to Vital Statistics of Scotch Hospitals.

It is stated in Hawkin's Elements of Statistics, that "mortality is seldom to be assigned to the influence of bad practice, which probably does not often destroy life;" that a friend of his "made particular notes on the comparative mortality under three physicians in the same hospital; one was expectant, one tonic, the other eclectic. The mortality was the same, but the length of the disorder, the character of the convalescence, and the chances of relapse were very different."

It was found * in 1811 that the average mortality of the general hospitals in Russia, which contained above 30 patients, was 1 in 9, but in those which contained less than 30, only 1 in 10, and in Scotland, it would appear, that the mortality is less in the smaller hospitals.

In the Royal Infirmary of Edinburgh, for the year ending 1st October 1842, the daily average number of patients was 303 ;

* C. T. Herrman, Mém de l'Acad. des Sciences de Petersbourg, Tom. ix. Petersburg. 1824.

the mortality 12.55 per cent.; the cures 68.89 per cent.; the period of treatment 29 days, and 5.09 cures to one death.

In the Glasgow Infirmary, for the year ending 31st December 1842, the daily average number of patients was 228, the deaths 9.63 per cent.; the cures 77.70 per cent.; the length of treatment 23 days, with 8.06 cures for one death.

In the Aberdeen Infirmary, during the year ending 31st December 1842, the daily average number of patients was 113. The mortality 4.66 per cent.; the cures 80.02 per cent.; the residence in hospital 21 days, with 17.15 cures to 1 death. And in the other hospitals the deaths ranged between 4.36 per cent. in the Northern Infirmary at Inverness; and 6.84 in the County and City Infirmary, Perth.

TABLE of the number of patients treated, and the deaths in 30 English Provincial Hospitals, (from material in the British Medical Almanac for 1836 and 1837) showing the average mortality in each.

Medical Institutions.	Period one year.	Treated.	Died.	Mort. p. cent.
Aylesbury General Infirmary, . . .	1835-6,	108	7	6.47
Bath United Hospital, . . .	1835,	814	47	5.77
Bedford General Infirmary, . . .	1835-6,	544	35	6.43
Birmingham General Hospital, . .	1828-9,	1556	68	4.37
Bristol General Hospital, . . .	1835,	279	13	4.66
Bury St Edmunds, Suffolk Hospital,	1833,	326	8	2.45
Canterbury Infirmary, . . .	1835,	501	10	2.00
Cambridge Addenbrooke Hospital, .	1832-3,	620	17	2.74
Chester General Hospital, . . .	1835-6,	518	21	4.05
Colchester General Hospital, . . .	1834,	284	9	3.16
Derby Infirmary, . . .	1828-9,	584	18	3.09
Exeter Hospital, . . .	1835-6,	1069	35	3.27
Gloucester Infirmary, . . .	1834,	646	33	5.10
Hereford Infirmary, . . .	1828-9,	300	11	3.66
Kingston-upon-Hull General Infirmary,	1835,	528	32	6.06
Leeds General Infirmary, . . .	1832-3,	1298	77	5.93
Manchester General Infirmary, . .	1833-4,	1852	139	7.50
Newcastle Infirmary, . . .	1828-9,	1100	28	2.54
Norfolk and Norwich Hospital, . .	1835,	774	46	5.94
Northampton General Infirmary, .	1833-4,	756	32	4.23
Nottingham General Hospital, . .	1835-6,	743	46	6.19
Oxford, Radcliffe Infirmary, . . .	1835,	853	25	2.93
Salisbury Infirmary, . . .	1833-4,	887	27	3.04
Salop Infirmary, . . .	1834-5,	834	30	3.59
Sheffield Infirmary, . . .	1835-6,	894	31	3.46
Stafford Infirmary, . . .	1828-9,	524	13	2.48
Winchester Infirmary, . . .	1833-4,	782	31	3.96
Worcester Infirmary, . . .	1828-9,	680	31	4.55
Suffolk Hospital, Bury St Edmunds,	1828-9,	250	7	2.80
York County Infirmary, . . .	1835,	305	19	6.22
Total,		21209	946	4.46

Here the mortality ranges between 2 per cent. in the Canter-

bury Infirmary, and 7.50 per cent. in the Manchester General Infirmary,—the average of all the thirty hospitals being 4.46 per cent.

TABLE showing the admissions, deaths, and ratio of mortality per cent., at different periods, in the Royal Infirmaries of Edinburgh and Glasgow.

Periods.	Year.	Edinburgh Infirmary.				Glasgow Infirmary.			
		Admitted.	Died.	Ratio mort. p. ct.	Aver. yly. adm.	Admitted.	Died.	Ratio mort. p. ct.	Aver. yly. adm.
1808 to 1817,	10	18785	1127	6.00	1878	11427	787	6.88	1142
1836 to 1842,	5	19624	2396	12.20	3925	23386	2690	11.50	4677

Note.—The admissions and deaths to the Edinburgh Infirmary for 1839, and to the Glasgow Infirmary for 1837 and 1838, are not included, having seen no report of these years.

Thus, in the Edinburgh Infirmary, during the ten years immediately preceding 1st January 1818, the average yearly admissions were 1878, and the deaths 6 per cent. During the last five years, the yearly average admissions were 3925, and the deaths 12.20 per cent.

In the Glasgow Infirmary, during the ten years previous to 31st December 1817, the average annual admissions were 1142, and the deaths 6.88 per cent. During the last five years, the admissions were 4677 per annum, and the deaths 11.50 per cent.

To this increase of mortality since 1817 attention shall afterwards be directed.

The following table exhibits no such increase of mortality as exists in the large hospitals of Scotland, with the exception of the Chester General Infirmary, and the Royal Infirmary of Manchester, where the admissions and deaths are both considerably increased. The mortality in some of the other hospitals has decreased during the period over which the table extends.

“The earliest statement which we possess of the mortality of our hospitals is in Sir William Petty’s work on Political Arithmetic, from which it appears that, in the year 1685, the proportion of the deaths to the cures in St Bartholomew’s and St Thomas’s Hospitals was about 1 to 7.” In the Royal Infirmary of Edinburgh, during the year ending 1st October 1842, the deaths were 1 to 5, being a greater mortality than existed in these hospitals upwards of 150 years ago. The annual printed report of St Thomas’s Hospital for 1689 is still preserved; the mortality was then about 10 per cent., and by the report of 1835–36, it was 8.7 per cent., or about 4 per cent. less than in the metropolitan hospital of Scotland. In no hospital does the ratio of mortality appear to increase where there has not been a great increase of patients.

TABLE showing the number of patients treated, the deaths, and ratio of mortality in the following fourteen Hospitals, at different periods, from data compiled from the British Medical Almanac and Dr Hawkin's Statistics.

Hospitals.	Periods.	First.				Periods.	Second.			
		Years.	Treat- ed.	Died.	Mortal per ct.		Treat- ed.	Died.	Mortal per ct.	Aver. Jy. admit.
Chester General Infirmary, .	1826to 1835	10	5331	920	4.1	1835to 1841	2	1214	7.3	607
Royal Infirmary, Manchester,	1752 1836	44	74360	3876	5.2	1836 1837	1	1890	11.0	1890
Kent and Canterbury Infirmary,	1793 1826	34	15697	655	4.1	1827 1836	10	4239	4.6	423
St Bartholomew's Hospital, London,	1790 1819	30	10186	903	8.8	1830 1834	5	4748	7.9	949
St George's Hospital, .	1830 1834	5	9500	1075	11.3	1835	1	2192	10.3	2192
London Hospital, .	1828 1833	6	13870	1622	11.6	1835to 1836	1	2517	10.3	2517
Westminster Hospital, .	1833 1835	3	2535	260	10.2	1835 1836	1	992	10.0	992
St Thomas's Hospital, .	1764 1813	50	—	—	6.6	1835 1836	1	3000	8.7	3000
Exeter Hospital, .	1826 1834	10	10145	396	3.2	1835 1836	1	1069	3.2	1069
Bristol Infirmary, .	1826 1835	10	15805	1925	8.3	1828 1835	1	1689	9.4	1689
Gloucester Infirmary, .	1829 1835	7	4253	241	5.6	1835 1836	1	646	5.1	646
Bath United Hospital, .	1827	1	551	30	5.4	1835	1	814	5.7	814
Lincoln Hospital, .	1826to 1835	10	2762	133	4.8	1836 1837	1	320	4	320
Addenbrook's Hospital, Cambridge,	1826 1835	10	6414	157	2.4	1832 1833	1	620	.7	620
Total, .			171409	10823	6.31		25950	2025	7.79	

* Out and in patients.

Some attribute the increase of the deaths in hospital to the greater mortality among fever patients than others; and with the view of ascertaining the accuracy of this inference, the following has been prepared :

Hospitals.	Period one Year.	No. of fever patients treated	Died.	Ratio of mort. per cent.
Hardwicke Fever Hospital, Dublin,	1826 to 1827,	2915	183	6.27
Wellesley's Fever Hospital, Dublin,	do.	2231	154	6.90
Leicester Fever House, . . .	1834,	104	11	10.57
Carlisle Fever House, . . .	1835,	51	9	17.64
Liverpool Fever House, . . .	1835,	1475	280	12.26
London Fever Hospital, . . .	1835,	337	52	15.43
Royal Infirmary, Edinburgh, .	1842,	851	115	13.51
Fever House, Glasgow Infirmary,	1842,	1194	120	10.00
In eight Scotch hospitals, . .	1842,	2774	274	9.87

Thus in Dublin about $6\frac{1}{4}$ per cent. of fever patients die—and throughout Scotland last year, it appears from the hospital reports, that 9.87 per cent. of fever patients died, or nearly 3 per cent less, than the average mortality of all the diseases treated in the Royal Infirmary of Edinburgh.

Exclusive of the 851 fever patients in Edinburgh, of whom 115 died, 2678 patients were treated for other diseases, of whom 328 died; showing a mortality of 12.25 per cent. among this 2678 patients.

The following table of Continental Hospitals, compiled from Dr Hawkin's *Elements of Medical Statistics*, shows the number of patients treated, the deaths, ratio of mortality per cent. in each of the following 26 hospitals.

Hospitals.	Periods.	Years.	Treated.	Died	Prop. deaths to the number treated.	Ratio Mort. per cent.
Hotel Dieu, Paris, . . .	1770 to 1780	10	—	—	1 in 4	25.00
Do.	1822	1	—	—	7	14.25
The Hospitals of Paris, .	1822	1	47393	—	8	12.50
Hospitals at Lyons, . . .	1822	1	—	—	11	9.09
Hospital at Montpellier,	1822	1	—	—	10	10.00
The General Hospital, the Charite at Berlin, . .	1796 to 1817	20	—	—	6	16.66
The Great Hospital at Vienna, (2000 beds), . .	1824	1	—	—	6	16.66
Civil Hospital, Pesth, . .	1826	1	—	—	6	16.66
City Hospital at Dresden,	1816	1	—	—	7	14.25
Hospital at Munich, . .	1819	1	3500	—	9	11.11
Hospital at Heidelberg, .	1825	1	285	—	21	4.76

Hospitals:	Periods.	Years.	Treated.	Died.	Prop. deaths to the number treated.	Ratio Mort. per cent.
Imperial Hospital at Petersburg, . . .	1803 to 1817	14	—	—	1 in 4.5	22.22
Do.	1816	1	2043	461	4.4	22.56
The Cantonal Hosp., Pays De Vaud, . . .	1825	1	344	16	21	4.68
St Pierre at Brussels, . . .	1823	1	—	—	9	11.11
St Pieter's Gasthuis at Amsterdam, . . .	1798 to 1817	20	—	—	8	12.50
General Hospital of Genoa, . . .	1821	1	1 death in	6 recoveries,	—	—
St Giovanni at Turin, . . .	1821	1	1 death in	7 recoveries,	—	—
The Great Hospital at Milan, . . .	1823	1	13278	1901	7	14.31
San Matteo della Pieta, at Pavia, . . .	1823	1	5287	—	10.5	9.52
Hospital at Padua, . . .	1820 to 1821	1	149	10	15	6.66
— Bologna, . . .	1816 1819	3	453	35	13	7.73
— Leghorn, . . .	1818 1825	7	—	—	7½	13.69
— Palermo, . . .	1823	1	4221	515	8	12.25
The two principal Hospitals at Madrid, . . .	1814	1	15230	1187	13	7.80
Do.	1818	1	14600	1223	11	8.85
Hospital at Valencia, . . .	1766	1	4800	639	7½	13.31
The Hospital Santa Cruz, Barcelona, . . .	1821 and 22	2	8205	1293	6½	15.75

Note.—The report from which the data is taken regarding “the two principal hospitals at Madrid,” does not express whether these were all *in-patients*, and consequently affords little information from its want of minuteness.

General Observations.—In the provincial hospitals of Great Britain the mortality is lower than in the metropolitan, and the same occurs in France and Germany. From this probably three inferences may be deduced. The first is, that in small hospitals probably the mortality is less than in large ones. The second is, that in hospitals in towns of moderate size, and perhaps with less dense population, the mortality is smaller than in large and densely peopled cities. The third inference is, that in cities and densely peopled towns, the characters of disease are of a more severe, unmanageable, and fatal character.

It is important to observe that, when 1878 passed through the Royal Infirmary in one year, the deaths were only 6 per cent.; now, when 3925 do so, the mortality over five years is 12.20; and 12.55 during the last year, notwithstanding the improved treatment, ventilation, &c. &c.

Since the year 1817 the price of provisions; wine, and articles of every description, are greatly reduced in price. Still the expenditure of the Royal Infirmary continues to advance; showing that

the patients of the present day are better cared for in every way than their predecessors.

To account for the increase of mortality is not very easy ; and it is probable that it depends upon several different causes. It is to be observed that it is, at all times, very difficult to explain any increased degree of mortality in any town or hospital ; and the subject is encompassed with multiplied sources of fallacy. One conclusion only seems to be well established, that the mortality of any given hospital does not depend upon the treatment, so much as on the nature of the cases admitted ; on the increased amount and density of the population, and on the increased prevalence of severe forms of disease. In regard to the Royal Infirmary of Edinburgh, the following remarks may be made.

At one time the general practice as to admissions into the Royal Infirmary, was either to refuse most cases of manifest organic disease, or, if they were admitted, to admit them only for a short period, and then dismiss them as improper cases. Thus almost all cases of tubercular disease of the lungs, many cases of disease of the heart, several cases of disease of the liver, and not a few cases of disease of the brain and spinal chord, as paralysis from softening, from tumours, paraplegia, &c. were refused admission altogether, or admitted for a few days only, and then dismissed as improper. The reason of this mode of procedure was, that it was argued the Royal Infirmary was chiefly, if not exclusively, fitted for the reception and treatment of curable cases, and every patient admitted labouring under a disease for which treatment could not, with any hope of success, be applied, was occupying the bed, and consuming those resources which were properly devoted to cases, to which treatment could be beneficially administered. The result of this was, that all cases of pulmonary consumption, diseases of the heart, and similar organic affections, were very generally excluded from the Royal Infirmary for a long series of years.

Gradually, however, the rigour of this rule came from various causes to be relaxed ; and probably in the method and principles of admission of patients, some of the physicians have gone to the opposite extreme. Our own knowledge of the population of the Royal Infirmary enables us to say, that, for many years past, cases of pulmonary consumption, disease of the heart, disease of the brain and spinal chord, disease of the kidney, disease of the liver, and chronic ulceration or other disease of the intestines are admitted without restraint or condition, and that in much larger proportions than they were twenty years ago, and that a considerable proportion of cases of this class die annually in the Hospital, and in this manner increase much, or, at least, contribute to increase the mortality of the Royal Infirmary.

It further appears from the recent reports, that incurable cases, that is, cases which lead naturally to the fatal termination, are ad-

mitted in considerable numbers. Thus it appears that, between the 1st July 1839 and the 1st October 1841, a period of 27 months, 154 males, labouring under consumption, were admitted, and 63 females, and of the former 82 died in the institution, and of the latter 42, or 124 of both sexes. During the same period 98 males labouring under organic disease of the heart were admitted, and of these 45 died, and 50 females, of whom 23 died. Another disease, which also leads very certainly to the fatal termination, is granular degeneration of the kidney. During the period already specified, 42 males and 35 females were admitted with this disease, and of the former 16, and of the latter 20 died within the walls of the hospital, forming, altogether, a mortality of 36 among 77 persons. Now, during two years the total admission of medical cases were 4768, or 2438 males and 2330 female patients. The total deaths among this number of patients amounted to 431 males and 303 females, or 734 of both sexes. When, however, we come to deduct from this number the large proportion cut off by fever, by pulmonary consumption, disease of the heart, and disease of the kidney, it leaves but a small amount of mortality for acute diseases.

Total deaths in 24 months,	.	.	734
Deaths by consumption in 27 months,	.	.	124
disease of heart,	.	.	68
disease of the kidney,	.	.	36
			228
fever,	.	.	301
			529 529

Deaths by other diseases,	.	.	205
or in one year,	.	.	102½

Much the same results proceed from the examination of the last two reports for 1842 and 1843. But these our limits will not permit us to examine fully.

It has been above said that not only is the rule as to the exclusion of incurable cases very much relaxed, but, in many circumstances, the physicians have gone to the opposite extreme. In other words, they have been compelled, often from motives of humanity, to admit cases of incurable disease which they were quite aware must in no long time terminate in death. This has been partly occasioned by the small size of the Royal Infirmary, and its limited accommodation compared to the wants of a population of above 165,000 persons. As there is not room to accommodate all the cases that present themselves, a selection is often made of the worst and most urgent cases, while those less urgent, which under former years would have been admitted, are sent away with advice. That this is the case appears very clearly from the numbers of those who are actually sent away as less fit for hospital ad-

mission than their more suffering competitors. From the record that is kept of this class of cases in the waiting-room, it appears that, from January 1843 to June 1843, the weekly average of patients refused admission amounted to 31. In the London Hospital, an institution which, from the density of the neighbouring population, and other circumstances, approaches the Edinburgh Infirmary, and in which the mortality is higher than in any other of the London Hospitals, one excepted, the rejections did not exceed 15 weekly.

Some persons not sufficiently acquainted with the causes by which the mortality of hospitals is influenced, have sought for them in the treatment, in the ventilation, and in other circumstances connected with the hospital or hospitals. Nor is it to be denied that some little influence may be ascribed to causes of this kind. That this influence, however, is much smaller than is usually imagined, will be manifest to those who know most of the kind of cases admitted into hospitals. It is well known that in organic diseases the influence of medical treatment is very limited, almost null; and practically, all the most intelligent physicians confine their treatment to the palliation of symptoms, well knowing that on the organic change remedies can exert no influence. It is not, therefore, to this cause that we can look either for increase or diminution of mortality. Life may be prolonged; suffering may be alleviated; the approach of death may be rendered more easy to the patient, and less frightful to spectators; though the blow cannot be averted, the period of its infliction may be deferred, and it may be made to descend more gently on the sufferer. In many instances of incurable disease it is the greatest charity in the world to allow a patient to await the approaches of death in an hospital, where all his wants are supplied, and all his sufferings alleviated much more completely, than if he were breathing his last amidst many bystanders, thoughtless or indifferent perhaps, and not unfrequently stupefied by strong liquors.

With regard to ventilation, the great answer to any objection derived from that source, is, that the worst ventilated hospital is provided with more pure air than what is found in the habitations of the persons who apply for admission; and the most indifferent hospital accommodation is greatly superior to what the majority of patients can command at their own houses.

If any one imagines that this is said with a view to discourage improvement in hospital accommodation, ventilation, and internal arrangement, that person is mistaken. Every one who has at heart the interest and welfare of the labouring poor, must rejoice to see hospitals made as perfect as possible in all circumstances of ventilation, warmth, and all those means which contribute to the comfort of those who suffer at once from destitution and bad health.

The following table shows the increasing expense of a patient in Edinburgh, &c.

in each of the following Hospitals.

Hospitals.	Description of Expense.	1836.			1837.			1838.			1839.			1840.			1841.			1842.		
		L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.
Edin- burgh, {	Average expense of each patient,	...	...	...	1	12	6½	1	12	9½	...	...	...	2	2	4½	2	2	6½	2	4	5½
	Do. yly. exp. of each occup. bed,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	26	16	10½	25	17	1¼
Aber- deen, {	Average expense of each patient,	...	...	...	...	...	...	...	...	...	0	19	11½	1	4	2	1	1	11½	1	1	11½
	Do. yly. exp. of each occup. bed,	...	...	...	...	...	...	...	...	...	16	19	10	18	14	7½	18	9	2¾	18	9	2¾
Dum- fries, {	Average expense of each patient,	...	...	...	...	...	...	...	...	...	2	12	1½	2	6	9½	2	6	9½	2	8	10½
	Do. yly. exp. of each occup. bed,	...	...	...	...	...	...	...	...	...	33	19	6	26	10	7¾	26	10	7¾	30	5	6
Mon- trose, {	Average expense of each patient,	...	...	...	...	...	...	...	...	...	1	8	0	1	10	10½	1	3	10½	1	3	10½
	Do. yly. exp. of each occup. bed,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	16	10	4½	16	10	4½
Glas- gow, {	Average expense of each patient,	1	1	8½	1	2	1½	...	...	...	1	15	8½	1	5	2½	1	6	9½	1	14	8½
	Do. yly. exp. of each occup. bed,	17	0	7½	...	...	...	...	...	...	23	17	10½	22	14	11½	22	17	1½	23	14	4½
Dun- dee, {	Average expense of each patient,	...	...	...	...	...	...	...	...	...	...	...	...	1	8	11½	1	19	4	1	10	8½
	Do. yly. exp. of each occup. bed,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	26	2	8	24	18	10½
Inver- ness, {	Average expense of each patient,	...	...	...	...	...	...	...	...	...	...	...	...	2	3	9	...	...	...	2	0	5½
	Do. yly. exp. of each occup. bed,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	18	13	0
Perth, {	Average expense of each patient,	...	...	...	...	...	...	...	...	...	2	15	5½	2	12	3½	2	17	10	2	5	6
	Do. yly. exp. of each occup. bed,	...	...	...	...	...	...	...	...	...	30	17	2	31	0	7	29	15	9½	29	12	8½

In the reports by the managers of the Edinburgh Infirmary, the daily average is only given for the years 1841-2, consequently the cost of an occupied bed cannot be shown at an earlier period. The average expense of each patient, without regard to residence in the hospital, cost L.1, 12s. 6½d. in 1837; and L.2, 4s. 5½d. in 1842.

In the Glasgow Infirmary the cost of each admission is 10s. 3d. less than in Edinburgh. This, in Edinburgh, during the year 1842, amounted to L.1807, 14s. 3d.; and regarding the expenditure, the directors of the Glasgow Infirmary state in their annual report, "that this continued economy in expenditure is effected, in perfect consistency with the most careful attention that every thing is abundantly provided essential to the real comfort and successful treatment of the inmates."

ART. VIII.—*Case of Extra-Uterine Conception within the upper part of the Fallopian Tube.* By ALEXANDER WATSON, M. D., F. R. C. S. E.

THE following case occurred in the practice of Mr Craik, surgeon, Forres, who gave me the uterus and other parts removed from the body of the patient.

The history of the case given by Mr Craik is to the following effect.

"Mrs T., aged 35, married, the mother of three children, and believing herself to be about two months gone in pregnancy, was attacked on the 24th of April 1843 with pain in the abdomen accompanied with constipation of the bowels. For these symptoms she applied to the Dispensary at Forres, where cathartic medicine was prescribed; and in the course of a day or two she was so well, that, on the 29th of April, she was able to walk a considerable distance, and carry home a load of fire-wood.

"It was afterwards ascertained that, four months previously, she had undergone a miscarriage; and that after that time she had been sensible of the presence of an unusual growth, or lump, as she termed it, in the left side.

"On the 1st day of May, exactly eight days after the first attack of pain in the abdomen, Mrs T. was suddenly seized in the afternoon at 3 o'clock with pain in the upper part of the hypogastric region, speedily followed by sickness and vomiting. The pulse was 106, small and thready.

"An opiate draught was ordered, fomentations were applied to the abdomen, and a turpentine enema was administered.

"May 2d, Spent a very restless night, but slept comfortably from 4 till 10 A. M. She then seemed pale and exhausted; pulse 120; she had cold sweats and an anxious countenance; lies on the left

le, though there is great tenderness to the touch. Ordered wine, andy, &c., but she continued to sink and died at 11 P. M."

During her illness Mrs T. complained of severe pain also in the sternal third of the clavicular region, which Mr Craik has remarked in several cases of lesion of the abdominal organs.

The body was inspected the ensuing day, and the appearances recognized were as follow.

Sectio Cadaveris.—"On cutting through the parietes of the abdomen a thick clot of dark grumous blood came into view; on moving which, along with from six to eight pounds of bloody tumour, the fundus of the uterus presented itself, having a rupture on its left side about two inches in length. From this aperture, portions of the chorion and the amnion, containing a foetus surrounded by fluid, protruded." The uterus was then removed from the body for further examination, and was given to me without having been cut open.

When viewed externally the body of the uterus seemed to be about four times the size of this organ in its unimpregnated state. On its left side, at the origin of the Fallopian tube, there was a hard tumour of about two inches and a-half in diameter, having the appearance of being attached to the uterus by a broad base; that, although it formed an apparent continuation of the uterus, there was a distinct indentation marking the line of separation between them.

The external covering or cyst, by which this tumour was surrounded, was of a deep red-colour, and was coated with layers of grumous effusion. At the upper part of the tumour there was a circular opening, about an inch in diameter, through which was distinctly seen an ovum, consisting of the amnion, containing a foetus surrounded by the chorion. The amnion was quite entire. At the situation of the rupture, the external parietes of the tumour had become remarkably thin.

Upon removing a portion from the anterior part of the uterus, and of the tumour connected with it, the two distinct cavities which they formed became obvious.

By inspecting the preparation, or the drawing made from it, (plate IV. Fig. 9,) the increased thickness of the parietes of the uterus, corresponding very much to the age of the foetus, as observed in ordinary cases,—the somewhat increased size of the cavity of the uterus,—the deciduary membrane lining it,—and the effusion of viscid mucus occupying the enlarged cervix, may be distinctly seen.

The cavity containing the ovum may also be seen to be distinct from that of the uterus. It is situated at the entrance of the Fallopian tube; and its parietes seem formed by the dilatation and thickening of the upper part of the tube, close to the body of the uterus.

From the size of the fœtus the pregnancy had probably existed for about three months. The placenta was situated at the lower part of the ovum, upon which the head of the infant rested.

The case now described is obviously one of extra-uterine conception, belonging to that class or division where the ovum is situated in the upper part of the Fallopian tube,—the ovum or vesicle having been arrested just before its entrance into the cavity of the uterus.

The fibrinous effusion upon the exterior surface of the cyst,—the symptoms under which the patient was labouring,—the thinning and bursting of the parietes of the tumour, demonstrate the previous existence of inflammation and progressive absorption at the seat of the rupture, which caused the fatal hemorrhage that ensued.

The importance of cases of the kind now described, in a medico-legal point of view, is too manifest to require more than simple mention. All these cases are attended with inflammation; all of them tend more or less speedily to rupture or detachment of the ovum with hemorrhage; and all of them give rise at this time to symptoms of violent peritoneal inflammation, complicated with effusion, and often masked by symptoms of fatal syncope. If the patient have received a blow on the abdomen, or has fallen, or has given herself a wrench, as is often stated to have been the case, the sudden fatal termination is almost uniformly ascribed to one or other of these circumstances; and in the first case, that of a blow or kick, it is the usual practice to ascribe the fatal result to such violence. It must be observed, nevertheless, that although external violence, or a fall, may accelerate the detachment of the ovum in this situation, the latter result may take place spontaneously; and, indeed, does take place spontaneously in a considerable proportion of cases. In two cases* in which I had occasion to examine the state of the parts after death, and in which the ovum was probably at a still earlier stage, it was alleged that death was produced by injuries inflicted on the abdomen. This may have been the case; but the unnatural position of the ovum must have determined the fatal result whether injuries had been the exciting cause or not.

ART. IX.—*Cases, with observations Pathological and Therapeutic.* By THOMAS STRATTON, M. D. Edin., Navy Medical Department.

1. *Case of Glossitis and Delirium Tremens.*

WHILE in many cases of angina or quinsy there is also inflammation

* One of these cases is detailed in my *Medico-Legal Treatise on Homicide*, p. 16; the other is unpublished.

ation of the tongue, this organ is often inflamed when the neighbouring parts of the mouth and throat are little or not all affected. Glossitis, from the excessive use of mercury, it is to be hoped, may now be reckoned among the antiquities of our profession. When it arises from some unknown cause, it is named spontaneous idiopathic; when it is occasioned by mechanical injury, as in the following instance, it may be called traumatic.

At Kingston, on the 10th of April 1841, Mr John P., aged 45, of a stout robust frame and rather intemperate habits, had at 10 A. M. a fit of epilepsy, in which he bit his tongue in four or five places, chiefly its left half.

12½ A. M. The tongue is a little abraded at the edges; there is slight ecchymosis, and it is slightly swelled and painful.

7 P. M. A great flow of saliva issues from the mouth; he feels his tongue very hot and painful, and he speaks with difficulty. To give a wash for the mouth, and to take a solution of tartrate of potassium and sulphate of magnesia.

April 11. Had no sleep in the night; the profuse flow of saliva from the mouth continues; he is not able to articulate on account of the size of the tongue. On opening the mouth, it looks as if it were covered with a large piece of black flesh; the organ is so large, that it is difficult to see its dorsum; its left half is larger than the right; its upper surface is brown; its under surface and edges are dark-coloured, from ecchymosis; there is no enlargement of it in breadth or length, only in thickness, it being swelled to more than three times its natural size; it feels hard, and it is painful on pressure; the floor of the mouth is raised a quarter of an inch above the level of the incisor teeth; the sublingual glands are hard and painful. Continue the antimonial solution.

5 P. M. Nausea, and vomited twice; six stools; skin cool; no headache; pulse of natural frequency, small. The tongue is a little less than in the morning, it having taken about twenty hours to reach its greatest size. Some tremor of the hands.

April 12. Had no sleep in the night; great flow of saliva; the tongue is smaller than it was last night; it is less hard and painful, and he can protrude it about half an inch; its left half is still larger than the right, and this is particularly evident on the dorsum; he can articulate pretty plainly; the sublingual glands are less hard and painful. Seven stools; some tremor of the hands.

10 P. M. He is very restless, and will not remain in bed; his language is very incoherent; he fancies a certain person, his superior, has sent for him, and he wishes to dress and go out for that purpose; he imagines the bed-room is arranged as a ball-room. On being ordered him to return to bed, he said, "How can I go to bed, don't you see it is laid out as a supper table?" (There had been a ball about a week before.) He was ordered to have two grains of opium, to be repeated in four hours, if he does not sleep.

April 13. Had no sleep; the delirium continues without any tremor; there is still one prevailing and constant idea, that he has been sent for and must go out; the other ideas are different and incomplete, and succeed each other as rapidly as one ripple follows another. The tongue is clean; it is smaller than yesterday; a deep mesial groove on its dorsum; its left half still larger than the right; five stools. To have one grain of opium, and three ounces of spirits during the day.

9 P. M. He slept for about an hour in the afternoon for the first time since the night of the 9th; his ideas are not so extravagant as in the morning; pulse 112, small; tongue continues to decrease. To have one grain of opium.

April 14. Slept for about seven hours in the night; no delirium; bowels open; tongue smaller. Continue the antimonial solution.

April 15. Slept badly; no delirium; the tongue is still more than twice the natural size; its surface is clean, moist. To have an alum wash for the mouth (eight grains to one ounce of water.)

April 17. Slight delirium in the night. To have one grain of opium.

April 20. No delirium since the 17th; the tongue is a little smaller daily, and by about the 29th of April, it had returned to its natural size.

Remarks.—On the second morning, the tongue being so much swelled, it was intended to scarify it in the course of the day, but in the afternoon, the swelling becoming a little less, and it being evidently about to decrease, scarifications were not judged necessary. As the organ was enlarged to more than three times its original size, an incision in it an inch deep would have appeared only a third of an inch when the swelling fell. This practice and venesection are no doubt the best in most severe cases. With regard to the great flow of saliva from the mouth in glossitis, whether the secretion be greater in quantity, or it merely flows in another direction; in mercurial glossitis, it was of course the former chiefly and in some cases partly the latter also. In the present instance mercury had nothing to do with the symptoms, but inflammation appeared to pass on to the glands, and their secretion was increased in quantity, as was shown by its flowing in abundance from the mouth before the swelling of the tongue was so great as to interfere much or at all with the process of swallowing.

On the 11th, some tremor being observed, it was thought that this might be a shadow cast before by coming delirium, and inquiry was made regarding the quantity of spirits he had been in the habit of drinking, when we found that for at least the last six weeks he had been accustomed to take daily three imperial gills (fifteen ounces) of rum, besides brandy and beer, the quantities of

which could not be ascertained. As the glossitis was now going off, the delirium tremens became the principal disease, and, in accordance with the theory that this disease is caused by suddenly discontinuing the use of ardent spirits, and cured by resuming it partly, the patient was allowed daily two or three ounces of spirits of the same kind (rum) as that of which he had been in the habit of taking fifteen, for antiphlogistic treatment is merely relative to the previous habits of the patient. The antimonial solution with sulphate of magnesia, by keeping his bowels free, allowed the opium to have its effect of calming the tremor of mind and body, and of restoring sleep.

Monro I. was the first (about 1740) to describe a disease which he observed to occur in persons on their suddenly giving up habits of drinking, and which he found to go off on their partially resuming them, (Edinburgh Medical Essays and Observations, Vol. v. p. 491). According to this theory, it might be said that, in the preceding case, the sudden discontinuance of spirits in a day and a-half induced the disease, while, by Dr Craigie, (Pract. Physic, Vol. ii. p. 82, Edin. 1840,) and others, it would be referred to the excitement produced by the local inflammation, and occurring in a constitution rendered morbidly irritable by the abuse of ardent spirits.

It was the patient's first attack of methystic brain-fever; there has been no change in his habits; and in September 1842, he had an attack of malarial remittent fever, the total abstinence from spirits during which time did not give rise to any symptoms similar to those which coexisted with his attack of glossitis, and this seems to favour Dr Craigie's view of the causation of the disease.

2. *On that Variety of Intermittent Fever named Asthmatic Ague.*

Among the spasmodic affections met with in ague, there have been described the cardiac, the hysteric, the colic, the epileptic, the tetanic, and there has been enumerated a sixth variety, the asthmatic. On referring to one of the most recent works on the practice of physic, the last form of paroxysm is thus noticed; "the asthmatic has been mentioned by Bonetus as occurring in tertian. According to the usual pathological principles of asthma, this would be referred to spasm either of the muscles of the glottis, or of the intercostal muscles and diaphragm. Unfortunately the descriptions are not sufficiently precise to enable us to say whether the difficult breathing arose from this cause or from congestion, or inflammation, or any other morbid state." (Dr Craigie's Elements of the Practice of Physic, Edinburgh, 1837, Vol. i. page 65.)

The following case in my practice, of which the symptoms were

noted by me at the time, appears to be an example of this variety of intermittent.

At Rios' Creek, Lake Erie, Thomas O'Brien, aged 16, ship-boy, (on board H. M. steamer Kingston, tender to H. M. ship Niagara), a thin, tall, fast-growing lad, August 3d 1839, at 9 P. M. was suddenly seized with severe pain in the sternal region and great orthopnoea; the pulse small and weak; his countenance very anxious.

9½ P. M. The dyspnoea and pain have almost entirely gone off. He was ordered a blister to the chest, a foot-bath, and a purgative of calomel and rhubarb, to be followed by sulphate of magnesia.

August 4th, 10 A. M. The blister has risen well; the bowels have been opened; no dyspnoea or pain in the chest; pulse and tongue natural; some weakness.

August 5th, 9 A. M. No pain nor dyspnoea; weakness; some appetite; tongue rather foul. To have a mild purgative of sulphate of magnesia and rhubarb.

12½ P. M. (At Amherstburg), I received a message (exaggerated as they generally are) to the effect that the patient was dying. I saw him immediately. There was extreme difficulty of breathing; at each expiration he made a shrill whistling noise; his face very anxious; he had a dread of impending dissolution; and the pulse was frequent, small, and weak. Cloths wet with hot water were applied to the upper part of the chest, and he was bled in the sitting posture to six ounces, when syncope was produced; the paroxysm in all its severity lasted a quarter of an hour. Before the vein was opened the pain had nearly all disappeared, and respiration had become much easier. By the end of twenty minutes the respiration was natural and there was no pain.

August 6th, 9 A. M. The blood is not buffed or cupped, and the crassamentum is of healthy firmness; no dyspnoea or pain; skin hot; tongue foul; several stools; weakness.

August 7th, 9 A. M. Slept a little in the night; skin hot; some thirst; tongue coated brown; no pain or dyspnoea; weakness.

10 P. M. Was suddenly attacked by severe cramp, first in the inferior extremities, next in the right iliac region, and then, by pain in the upper part of the sternum, great difficulty in breathing, and at each expiration making a loud shrill whistling sound; this went off in about fifteen minutes. During the paroxysm there was a sinapism applied to the upper part of the sternum, and he had a draught of *Spirit. Ether. Nit.*, &c.

August 8th, 9 A. M. No dyspnoea; skin natural; slight thirst; tongue foul; pulse soft, weak; no appetite; three stools. To have quinine and port wine.

8 P. M. Had a short paroxysm of pain at the middle of the

sternum and dyspnœa. This fit was less severe than the former ones, and there was no whistling sound in expiration.

August 9th (at Chatham, near Lake St Clair) 9 A. M. Pulse, skin, and tongue natural; no pain or dyspnœa; some appetite; one stool; slight headach in the night from noise. Continue the quinine and wine.

10 P. M. Chilly and shivering for about two hours.

August 10th (at Amherstburg), 2 A. M. Cramp, first in the inferior extremities, and then in the abdomen for about ten minutes.

9 A. M. No pain or dyspnœa; weakness. Continue the quinine.

After this, he had no further attacks of dyspnœa, pain in the chest, or cramp. He took quinine for some days, and in about another week he recovered.

Remarks — The patient had ague several times before his present attack of illness. The vessel was conveying the Governor on a journey through the province, and at Dunnville,* Amherstburg,† Chatham, and other towns visited, ague and remittent were very prevalent, and many men in the ship were ill of the same.

The analysis of the case is this:

Paroxysm lasting, August 3d, 1839, from 9 P. M. to 9½ P. M. Dyspnœa and pain in the chest.

August 4, none.

August 5, from 12½ P. M. to 12¾ P. M. Pain in the chest, extreme orthopnœa, whistling expiration, great anxiety.

August 6, none.

August 7, from 10 P. M. to 10½ P. M. Cramp in the legs, then in abdomen, and then pain in the chest and dyspnœa as before.

August 8, from 8 P. M. to 8½ P. M. Dyspnœa less severe than before.

August 9, from 10 P. M. to 12 P. M. A shivering like that of ague.

August 10, from 2 A. M. to 2½ A. M. Cramp in the legs and abdomen.

The similarity of the paroxysms (with respect to both nature and time) on the 3d and 5th, is perhaps sufficient to constitute this a case of asthmatic tertian. The third fit on the 7th continues the proof; and further allies it with the more general class of spasmodic agues. The fourth attack on the 8th shows the disease to be now assuming the quotidian form, and its diminished severity is, perhaps, owing to the use of quinine. On the ninth of the month in the fifth paroxysm, consisting of the cold stage of ague, nature, as it were, presents the observer with a key to her previous

* Edinburgh Medical and Surgical Journal, April 1841, page 350. † Ibid.

operations, and the declining condition of the complaint is shown by the slightness of the sixth and last paroxysm on the 10th of August.

The patient has since been the subject of repeated attacks of common ague.

The proofs of the nature of the disease, drawn from the effects of treatment, are these. The blister applied at the time of the first paroxysm had no effect on it, as it ceased in a quarter of an hour, and the venesection at the time of the second fit had no effect on it, as it was over almost before the blood began to flow. The early syncope also, * and the appearance of the blood oppose the idea of inflammation.

The principal other parts of the treatment were purgatives and quinine. The latter having apparently no injurious effects, tends to disprove the existence of inflammation, while its exhibition, and the cessation of the periodic attacks may be in the relative condition of cause and effect. †

That the symptoms arose from congestion or inflammation is also disproved by the entire freedom from them, except during the short period of the paroxysm.

The patient is at this time (May 1843) in good health, and has not had a return of the same affection.

Referring to the paragraph already quoted from Dr Craigie, on the question on what asthmatic ague depends in the present case, in each paroxysm there were the following symptoms :

Paroxysm First.—Symptoms were spasm of the muscles of the chest.

Second.—Spasm of the muscles of the chest and of the glottis.

Third.—Spasm of the muscles of the legs, abdomen, chest, and glottis.

Fourth.—Spasm of the muscles of the legs, abdomen, chest, and glottis.

Fifth.—No spasm; an incomplete fit of ague.

Sixth.—Spasm of the muscles of the legs and abdomen.

It may, therefore, be said that asthmatic ague does not depend on congestion or inflammation, but on spasm.

Treatment.—After the paroxysm is over, the treatment of asthmatic ague is the same as of common intermittent fever, namely, the exhibition of calomel purgatives, and after their operation the employment of sulphate of quinine.

* Dr Marshall Hall.

† Or from the natural tendency of most kinds of diseased action to spontaneous abatement. Dr Alison's *Pathology and Practice of Medicine*. Edin., 1843, p. 74.

*Kingston, Canada,
May 1843.*

ART. X.—*On the Origin of Malaria.* By HENRY M'CORMAC, M. D., Belfast.

To the Editor of the Edinburgh Medical and Surgical Journal,

SIR,—Some most interesting observations in your last Number on the important subject heading this article, from the respected pen of Fergusson, arrested my attention and turned it afresh in the same direction.

I am most ready to admit with Dr Fergusson, the difficulties connected with a satisfactory explanation of the origin of malaria ; but I am not disposed to go along with him, nor do I think that he has proved his position, that *Malaria* so termed, is merely of telluric origin—an emanation from the elemental soil.

All the localities instanced by Dr Fergusson as productive of malaria in Spain, Portugal, Holland, the West Indies, and he might have added Italy and the southern parts of the United States, as well as Africa, without the intervention of marsh or marsh land, are, nevertheless, situated in regions where marsh land abounds. As Dr Fergusson's only object, however, in taking up one opinion more than another, is for the single purpose of expressing his convictions and elucidating truth, it is needless to continue the ungracious task of unnecessarily questioning his conclusions. I shall therefore simply proceed to state my reasons for asserting that that modification or poisonous impregnation of the atmosphere termed malaria or marsh miasm, is in every case of vegetable origin.

It is now admitted on all hands, that septic products arising from the decomposition of azotized matters, the flesh of men and animals, a few rare instances excepted, is never productive of continued, much less periodic fevers. Whether, in addition to the products of vegetable decomposition, it be capable of aggravating the effects of the latter, is a question into which I shall not enter.

It were natural to expect that the poison of malaria should come under the inspection of the senses, but it is not so ; we are aware of its existence more as matter of inference or exclusion, than of direct demonstration. It may possibly be united with, but does not, so far as we know, consist of, or reside in any of the gaseous elements which chemical science has hitherto been able to detect. It has nothing to say with carbonic acid gas, or sulphuretted hydrogen. The neighbourhood of the swamp, as Fergusson has shown, may reek with the effluvium of the latter, and yet be perfectly healthy ; while, as he has also observed, the air may be free from stench, and yet replete with the malarious poison. The air of the swamp, indeed, so far as chemical analysis is concerned, is pure as that at the hill top ; but chemical science fails to detect

the poison of small-pox, or scarlatina, or measles, or plague, or continued fever, when mingled with the atmosphere; and need we therefore be surprized if it also fail to detect the poisonous principles of malaria.

That malaria is the result, and the exclusive result of vegetable decomposition, aided by a temperature ranging from 80° of Fahrenheit's thermometer upwards, is, I conceive, the only conclusion to which, in the present state of our knowledge, we are permitted to come. If the temperature prove habitually below 80°, whatever be the exuberance of vegetation or the quantity of marsh land, malaria is never generated. Malaria does not subsist in the north of England, nor in Scotland, nor in Ireland, nor in Sweden, Denmark, or Norway, nor in the colder parts of Europe, Asia, North and South America; in fine, nowhere so long as the temperature a few degrees more or less, keeps below 80°. Let it rise above this, and thereupon we have malaria and periodic fever in all its forms. If the thermometer ranged but twenty degrees higher in the temperate regions which I have mentioned, malaria would as instantly be elaborated. It has been asserted that Ireland was exempt from malaria, owing to the antiseptic property of her bogs; but it arises solely from the lowness of its temperature. There are peat lands in Holland and France, but plenty of malaria notwithstanding. If the summer temperature in Ireland ranged habitually from 80° to 100°, paludal fever would prove even more frequent and destructive than ever continued fever was known to be. In point of fact, some low lying ranges of the uncultivated land near Dublin and Belfast, were said during hot summers, thirty or forty years ago, to be productive of malaria; but there is nothing of the kind now, and intermittent fever is rarely witnessed in Ireland except in persons who have been abroad, or the poor serfs who go to reap the harvests in the marshes of Essex and Lincolnshire;—just like the mountaineers who, during hundreds of years, have descended from their hills to cut the grain in the Maremma, and with the same result.

It is admitted by every one that marshes in warm climates, the Pontine marshes, those of Sienna, the Americas, and the West Indies, are productive of malaria and fever. In the height of the rains indeed, when the marshes are brim-ful, and everything is reeking with moisture, malaria is not so rife; once, however, the marshes begin to decrease and dry up, then comes malaria with all its sweltering horrors. But after a time, the fierce sun has done its utmost, the moisture is dissipated, and malaria and raging fever are once more on the decline.

How do sun and moisture acting on vegetable remains produce malaria? We know not; but so it is. Wherever the reeking marsh and the hot sun present themselves, there we have malaria, there periodic fever. This is alike unquestioned

and unquestionable ; it is a fact which nobody denies, which nobody can deny. If this, then, be granted, it seems to follow as a necessary consequence, whatever difficulty may lie in the way, that wherever we have malaria and periodic fever, vegetable decomposition, aided, be it always understood, by a temperature above 80° , and more or less moisture, must have been the source ; and, so far as we know, the only source. Where the temperature is not above 80° , and where there is no moisture, neither is there malaria, neither is there fever.

Dr Fergusson speaks of sandy valleys in the West Indies, as well as of sandy tracts in Spain, Portugal, and Holland, arid, verdureless, yet the prey of malaria. And why, he asks, and justly, —if malaria be the exclusive result of vegetable decomposition aided by heat and moisture, why have we malaria, and that, perchance, in the most virulent form, where there is no vegetation and no moisture ?

I do not think the foregoing difficulty so insuperable as it has been made to appear. Either the malaria is generated on the spot, or it is transported from a distance. I see no occasion to have recourse to the hypothesis of an inscrutable telluric or earthly emanation, when an origin so much more likely can be pointed out. We know that miasmata are transported by the wind on the level ground, that they will even run along dried-up water-courses, and other artificial or accidental hollows, and that they ascend a certain distance along the sides of mountains. How far they are capable of extending from the site of their production, we do not know ; but if the source prove plentiful, it is obvious that they may be transported to a great distance before they become sufficiently diluted to lose their virulence. It is in conformity with this view of the case that we never meet with malaria in any place, as a mountain height, or sandy bluff or plain, where marsh and moisture are absent, that both one and the other will not be found at no great distance. I know no exception. The dry sandy bluffs of Georgia, and those of Natchez in the United States, the heights above Vera Cruz in Mexico, and the dry clay hills at Sierra Leone, where the burnt-up, and iron-stained soil is almost too hot for the naked sole to rest on, are all malarious, and why ? Why, but because the malaria has been carried from the reeking marsh lands below, or in the vicinity. If it be not generated on the spot, it must come from a distance. There is no other alternative.

Paludal poison, or rather the air which proves its vehicle, seems to obey many of the laws of a fluid body. It flows in channels, or along the surface ; it is deflected in its course, or arrested altogether by the objects which it meets with. It will creep up a mountain slope no doubt ; but it may be arrested by a wall, or a

grove of trees, so that on one side there will be immunity, on the other death ! The culture of the soil, whereby it is broken up and exposed to the air and human abodes, if not immediately, at least remotely, all tend to disperse or intercept the malarious principle, and mitigate its venom.

Is it always certain, however, in warm climates, that sandy flats and clayey plains, however dry to the eye, may not contain both moisture and vegetable remains in the recesses and clefts below ? The arid surface drinks up the copious rains, vegetable remains are washed below, particularly in the case of dried-up torrents, and prove the eventual source of malarious exhalations. But if this hypothesis fail, it seems quite enough to assume that the malaria was transported from a distance, and sucked up in the case of sand at least, by the bibulous soil. The power of foliage in this respect is well known. But whichever of these two hypotheses be the explanation, it is not the less certain that malaria is never found to subsist on heights, on sandy or other plains, divested of vegetation and moisture, without the existence of both at no insuperable distance.

It has already been stated that malaria neither exists nor spreads, however abundant the moisture and vegetation, unless when the temperature is permanently elevated, and elevated for a sufficient period to generate the paludal poison. On the sea shore of St Domingo we have yellow fever ; on the interior, but more elevated plains, we have remittent fever, hardly less fatal ; but on the mountains we have only intermittents, comparatively mild. On the southern coasts of the United States we have remittent fever, in the interior intermittent ; but let the summer prove unusually hot, the yellow fever raises its slimy front from Maine to Florida. New-comers in the West Indies, or in Guiana, are always, in the sickly season at least, liable to yellow fever ; but if a season of unusual severity ensue, the old residents, as they are termed, otherwise exempt, also prove victims. At Sierra Leone the remittent always subsists, but only occasionally puts on the aspect of yellow fever and black vomit, which the colonists then look upon as an imported disease. But the fact is, a certain considerable elevation, if it be possible to obtain it, proves an invariable security against yellow and remittent fever ; but unless the height prove very great, not against simple intermittent ;—all these, however, grades of one and the same malady, the results alike of malarious poison.

I now proceed to further proofs, direct as well as indirect, of the exclusive reference of paludal poison to vegetable decomposition, aided by heat and moisture. I shall not pause on the fact, that the more elevated and better cultivated interior of Africa is freer from malaria, and, consequently, from fever, than the coast.

Once this vast continent, indeed, trends into a southern, and therefore, cooler latitude, the climate becomes most salubrious ; witness the Cape of Good Hope. The regency of Algiers is afflicted with periodic disease ; but once the mountains are crossed, and we reach the confines of the mighty desert of Sahara, those arid, treeless, plantless wastes, increasing year by year, and whose area even now surpasses the Mediterranean sea, there we meet with no malaria, local or imported, and, consequently, no fever. No, the desert of Sahara is free from paludal poison, and from remittent as the ocean itself, because in the one case there is heat but no moisture, no vegetation ; in the other moisture and warmth enow, but of vegetation none. Quit the malarious coasts of Africa and plunge into the desert on one side, or seek the ocean on the other, and you are alike free from the murderous malaria, in a word, totally exempt from this source of disease.

And yet there is an exception in the case of the sea, which fortunately is conclusive of the question. Vessels have left a malarious shore, yet free from periodic disease ; perchance, they have never even touched at a malarious spot ; but after they have been a certain time under the influence of the burning sun, the vegetable filth which sometimes collects on board, in the many corners and crannies of a ship, gives out a fatal poison, the result is the well-proved production of remittent yellow fever, in the lower decks especially ; as much as in the midst of the most infected marsh or otherwise malarious locality.

The Gulf of Mexico and the opposite coast of the Pacific is alike infested with malaria and fever. The latter decimates the inhabitants of some parts of Central America ; yet once we ascend the rocky heights of the Andes, or bury ourselves in the sandy deserts of Peru and Chili, then we become exempt from malaria and its consequences.

It is not, perhaps, likely that these remarks will convince those from whom I have the misfortune to differ ; but they will, perhaps, help to set the question of the real and only origin of malaria in a clearer light, and thereby assist those who are anxious to arrive at a correct decision in forming their conclusions.

Belfast, May 25, 1848.

ART. XI.—*Pathological and Histological Researches on Inflammation of the Nervous Centres.* By JOHN HUGHES BENNETT, M. D., F. R. S. E., Fellow of the Royal College of Physicians, Lecturer on the Practice of Physic and on Clinical Medicine, Pathologist to the Royal Infirmary of Edinburgh, &c. (Concluded from No. 155, p. 347.)

THE two following observations are valuable in many points of view, and tend to confirm the results previously arrived at.

Obs. XXXII.—*Fever ; Cephalalgia ; Delirium ; Fungoid tumour at the base of the orbit ; death in thirty-six days ; abscess in the left anterior lobe, surrounded by fawn-coloured softening, containing numerous exudation corpuscles ; yellow softening of the central substance of left hemisphere containing neither purulent matter or exudation corpuscles.*

John Vallence, aged 24, an iron-founder, admitted into the Royal Infirmary, under Dr Craigie, March 2d 1843. Eight days previously he had been seized, after exposure to cold, with pain, swelling, redness of the left eye, and pain in the forehead. On admission the eye-ball was swollen, red and tense. There was great sensibility to light, with chemosis, and increased discharge from the left nostril. The vascularity of the right eye was also increased. The tongue was loaded, and there existed a typhoid eruption on the skin over the back and chest. Pulse 100, full and hard. (*Venesection. ad 3xij. Saline Mist.*) The bleeding produced considerable relief ; pulse fell to 92. March 4th, The bleeding was repeated to 3xvj. and again caused diminution of the pain in the eye and forehead. There is a profuse discharge from the eye and left nostril. A tumefaction with obscure fluctuation is perceptible in the forehead, above the left eyebrow. He has passed a restless night with muttering and delirium. March 6th, The swelling in the forehead was opened yesterday, and a small quantity of matter evacuated. Complains much of debility. March 7th, There is a purulent discharge from the incision and from the left nostril. The delirium and constitutional symptoms are abated. The eye now became daily more and more protruded from the socket. The eyelids continuing very tense and swollen. They were occasionally punctured with relief. He always complained of more or less pain in the forehead, and the discharge continued up to the time of his death. On the 30th of March, after drinking largely of tea, he complained of cold shivering, which was soon after followed by coma and stertorous breathing, and he died in about twenty minutes, at half-past five P. M.

Section, April 1st 1843.—On removing the skull-cap, the hemispheres anteriorly were found somewhat flattened, and the convolutions pressed together. An abscess the size of a hen's egg existed in the

left anterior lobe of the brain, anterior to the *corpus striatum*, lined by a yellow membrane. This abscess communicated with the base of the cranium, and extended somewhat into the right anterior lobe, both lobes being adherent. Superiorly it was connected with a fungoid tumour involving the bone at the inner side of the orbit; internally encroaching on the nasal cavities, and externally pushing out the eyeball and stretching the optic nerve. The cerebral substance surrounding the abscess was softened and of a fawn colour. The central medullary substance, on the left side, was much diminished in consistence, and even pulpy towards the centre of the hemisphere. It was of a light straw-colour, in every way resembling purulent infiltration.

The other organs were not allowed to be examined.

Microscopic Examination.—The abscess was composed of normal purulent matter. The fawn-coloured softening surrounding it contained numerous exudation corpuscles and granules. The straw-coloured softening, in the central medullary substance of the hemisphere, was wholly composed of the medullary and varicose tubes, very much broken down, without any trace of purulent matter or exudation corpuscles.

Remarks.—In this case intense cephalalgia and delirium were the leading cerebral symptoms. After death an abscess surrounded by an inflammatory softening existed in the left anterior lobe, to which these symptoms may be ascribed. The medullary substance of the hemisphere, however, was also softened and of a light straw-colour, exactly resembling to the naked eye, a purulent infiltration. Dr Craigie pronounced it to be the yellow inflammatory softening described by all pathologists, which it undoubtedly was. Yet, on examination, it contained no purulent matter or exudation corpuscles, or presented any traces of inflammation, and when compared with the softening surrounding the abscess, it became evident, was of a nature totally different.* Now if we regard the symptoms, and mark the absence of paralysis, contraction, and the other signs, which, in numerous instances, we have seen to characterize inflammatory softening of the central medullary substance, we cannot, for a moment, suppose that this lesion was the result of inflammation.

I attach great value to this case. 1st, Because the lesion, to the naked eye, was so characteristic of yellow softening, exactly corresponding with the descriptions of Rostan, Lallemand, and others. 2d, Because a pathologist, in every way so candid and deserving of confidence as Dr Craigie, pronounced it to be inflammatory, which it would certainly have been considered by every pathologist without an appeal to the microscope. 3d, Because, on comparing it with a really inflammatory softening existing in another portion of the brain, the histological differences we have pre-

* Drs Craigie, Watson, and Peacock were present, and acknowledged the truth of this, on seeing the demonstrations under the microscope.

viciously pointed out became evident, as was acknowledged by all present.

OBS. XXXIII.*—Hemiplegia of the right side ; loss of consciousness ; convulsions of the superior extremities ; death in thirteen hours ; capillary hemorrhage into both corpora striata, but to the greatest extent on the left side ; central medullary softening ; absence of exudation corpuscles and granules.

Sarah Ford, aged 21, a milliner, was seized at about 8 o'clock A. M. on the morning of August 2, 1843, when getting out of bed, with paralysis of the right arm and leg. She was immediately put to bed, when she exclaimed "Oh dear," lost all consciousness, and was attacked with convulsions of the superior extremities. When seen at two P. M., she was still unconscious, and the superior extremities were convulsed. There was also grinding of the teeth, and foaming at the mouth. The pupils were dilated, but contracted on the application of light. The impulse of the heart was felt all over the chest. Action of the arteries very violent ; pulse 120 ; bowels confined. (Venesection ; leeches to the temples ; blister to the nape of neck ; enemata.) The convulsions ceased after the bleeding. She continued, however, insensible, and died at 9 P. M.

The patient had been out walking on the day previous to the attack with some friends, and was considered by them to be more cheerful than usual. She menstruated regularly every fourth week. She had, however, occasionally complained of headach, and caused her mother to notice, a week previous to the seizure, a more than usual pulsation in the carotids.

Sectio, 36 hours after death.—On removing the *dura mater* the convolutions of the surface of the hemispheres were found much flattened, and the arachnoid was somewhat dry. The vessels of the *pia mater* displayed an unusual turgescence. The ventricles contained about $\frac{3}{4}$ ij. of bloody serum. The *plexus choroides* on both sides enlarged from an extravasation of blood into its texture. The *corpora striata* were infiltrated throughout their substance with numerous and very minute dark-coloured extravasations of blood,—that of the left side was rendered completely pultaceous and broken up, resembling lees of wine. The extravasation appeared to be confined to the gray matter, the adjacent medullary substance presenting its normal colour and vascularity, although its consistence was somewhat diminished. Lungs healthy. Heart flaccid, and its lining membrane dyed, probably from exudation, the body being much decomposed. Abdominal organs healthy.

Microscopic Examination.—The nervous tubes were readily separated from each other, but neither in the medullary or gray matter were any exudation corpuscles or granules apparent.

Remarks.—This case is very similar to Obs. XV. Sudden apoplexy, preceded by cephalalgia, convulsions, but no contraction,

* For the particulars of this case I am indebted to the kindness of Dr M'Cormac, Physician to the Canongate Dispensary.

and death in a short period. The medullary substance, though softened, in neither case presented exudation corpuscles or granules; and it is worthy of remark that here also there were none of the symptoms of inflammatory softening. These results are very important, as it has lately been stated by M. Durand-Fardel, that softening connected with sanguineous infiltration, is a proof of inflammation. The consideration of this question, however, will be found in a subsequent part of the paper.

In consulting works with a view of determining how far the labours of others might serve to assist in this inquiry, I can only discover twelve observations of inflammation of the brain recorded, where the diseased structures have been examined microscopically. These, unfortunately, are very imperfect, and can only be partially taken into consideration. I shall avail myself of them, however, as far as the facts recorded will allow. In order to afford others also in this field of inquiry all the information that exists on the subject, I shall now combine these observations with my own, numbering them consecutively to facilitate subsequent references.

Eleven observations have been published by Dr Gluge in the *Oestreichische Medicinische Wochenblatt*. Unfortunately, I have not been able to procure the original memoir, and am indebted to the *Provincial Medical Journal*, for November 1842, for the following account.

Obs. XXXIV.—Female; paralysis; pultaceous softening of several points of the cerebrum and cerebellum, both in the gray and white substances.

Microscopic Appearances.—The nervous canals were broken up into fragments, but not changed in appearance; these fragments were mixed up with spherical, opaque corpuscles, ten times larger than purulent matter globules, and enveloped by numerous small globules, which were easily separated by slight pressure; the latter were spherical and transparent. When the scalpel was dipped into the softened mass, the drops which fell from it contained a great number of the above-mentioned corpuscles mixed with fragments of nerve tubes. The healthy portions of the brain did not contain a trace of them.

Obs. XXXV.—Male; cerebral symptoms without paralysis; softening to the extent of a few inches of the anterior lobe of the cerebrum.

The softened mass contained a few fragments of nerve tubes with a great number of the globules already mentioned, agglomerated together.

Obs. XXXVI.—Female; apoplexy; paralysis of left side; recent attack within fourteen days; extensive softening of the right hemisphere, which was of a mixed red and gray colour; left hemi-

sphere injected, but of a natural consistency ; apoplectic clots in both, and a reddish-coloured fluid in both ventricles.

The latter contained agglomerated globules, and fragments of nerve tubes ; and the coagulated blood enclosed similar fragments. An enormous number of agglomerated globules were found in the substance of the right hemisphere, and but very few on the left side. Nerve tubes could not be discovered in the coagula.

OBS. XXXVII.—*Male ; paralysis of the left side for several months ; red softening of the right hemisphere ; great congestion of the capillary membrane.*

The nervous tubes are shrunken, or not easily discovered, and only small fragments of them can be found in the softened portions of the brain ; in the remainder they are unchanged. The agglomerated globules exist in great quantity in the white and gray softened parts.

OBS. XXXVIII.—*Female ; sudden attack four weeks before death ; paralysis of right side, and contraction of limbs ; effusion of blood into, and softening of right ventricle.*

The softened mass contained nothing but fragments of nerve tubes, mixed with a great number of agglomerated globules in the white and gray substance, the capillary net-work round the softened parts were deeply injected.

OBS. XXXIX.—*Male ; constant delirium ; excessive sensitiveness of the skin ; contraction of right arm ; no paralysis ; deep-red softening of right hemisphere ; some straw-coloured fluid in left ventricle ; upper surface of corpus striatum softened ; white softening of pons and corpus callosum ; gray red softening in the cerebellum.*

The fluid of the ventricles contained some blood corpuscles and agglomerated globules. In the portions of nervous substance affected with white softening were some fragments of nerve tubes, which were scarcely recognizable, and some globules, an immense quantity of which existed in the red softened parts. In the middle of the cerebellum was a softened gelatinous spot, about the size of a halfpenny ; here the nervous tubes were easily distinguished with several agglomerated globules and numerous pus globules, from the admixture of which arose the gelatinous appearance.

OBS. XL.—*Female, 40 years ; had an apoplectic attack six weeks previously ; paralysis of left side. The posterior portion of the right hemisphere exhibited every gradation of red softening up to yellow points, but the softened parts were not diffuent ; in a small portion there was white softening, without any change of colour whatever.*

In this part the nerve canals were collected into bundles and shortened, and a white amorphous substance was interposed between the fragments of the tubes ; no trace of agglomerated globules, which, on the contrary, were numerous in the points of red softening. Here the tubes had either disappeared or were reduced to mere striæ ; the yellow points looked under the microscope like masses of fat globules.

OBS. XLI.—*The patient had complained for a long time of head-ach, stupor, and creeping sensations in the limbs ; cavities in the hemisphere, and pons lined with a species of reddish membrane.*

The surrounding nervous substance was softened, and here was a large quantity of agglomerated globules.

OBS. XLII.—*Fall from a height ; fracture of skull ; death ; effusion of blood at the base of the cerebellum in both ventricles, and in various parts of brain ; pullaceous softening of several points, with fragments of nerve tubes, but no trace of agglomerated globules ; fragments of the tubes and of the cellular net-work in the coagula.*

This case furnishes an example of mechanical softening from effusion of blood.

OBS. XLIII.—*Apoplectic softening without any product of inflammation.*

Numerous fragments of lacerated cellular net-work, and unaltered nerve tubes in the apoplectic cell, and no trace of globules in the softened mass around it.

OBS. XLIV.—*Girl, 16 years old ; apoplectic clot in the pons ; death on the day of attack ; the patient had merely complained of headach. Throughout the medullary substance the net-work of fine cellular tissue strongly injected ; in the coagula lacerated nerve tubes. Ostr. Med. Woch. Jan. 22 1842. Prov. Med. Journ., No. 113, November 26th 1842.*

Remarks.—The foregoing observations appear to be mere notes made from time to time so as to assist the memory, rather than to give such information as was desired. Neither the age of the patient, or the symptoms, the *post mortem* or microscopic appearances are given with sufficient exactitude to enable us to draw from them any very satisfactory conclusions. Yet it is evident that Gluge saw exudation corpuscles in many cases of inflammatory softening, (Obs. XXXIII. to XI.) and that in other instances where the brain was also softened, he found none. (Obs. XLI. to XLIII.) Obs. XXXVIII. is interesting in many points of view, although the looseness of detail leaves much to be desired. For instance, neither the duration of the disease nor the extent of the red softening is mentioned. But the difference in structure between this red softening of the hemisphere and the white softening of the central portions is noticed. The gelatinous spot containing pus globules in the centre of the cerebellum was probably an abscess. In Obs. XXXIX. also, the different structure between the inflammatory and non-inflammatory softening is noticed ; but the nerve canals being collected into bundles and shortened, &c., probably arose from something unusual in the demonstration. I have frequently seen such appearances, but on endeavouring to reproduce them, have failed.

Hence, I have always attributed them to some peculiarity of size or shape in the portion of brain examined, or to the mode of squeezing it between the glasses. In Obs. XL. it is shown that inflammatory softening sometimes surrounds old apoplectic cysts, as has previously been noticed, (Obs. XI. XII. XIII. and XXIV.) In the three last cases he has pointed out that softening produced by mechanical injury and by apoplexy proving suddenly fatal, contains no exudation corpuscles, confirming the results previously given, (Obs. XIV. XV. and XXI.)

Since the above was written I have seen in the work of M. Durand-Fardel,* another analysis of Gluge's memoir, which appears to have been originally published in the *Archives de la Médecine Belge, Janvier et Fevrier 1840*, and copied into *l'Experience, 30th Avril 1840*. Neither of these journals has it been possible for me to procure in Edinburgh. It would seem, however, from the account of M. Durand-Fardel, that the eleven observations now given are the same which constitute the basis of his original memoir, although he states that in his 10th case (Obs. XLII.) globules of purulent matter were present in the softening; a circumstance which appears to me very improbable, and is quite opposed to all the observations I have hitherto made. The following, also, are given as the conclusions arrived at by M. Gluge. "1st, White softening contains purulent matter in a great number of cases; 2d, The coloured softening, without extravasation of blood, presents the products of one of the first degrees of inflammation, formation of compound globules; 3d, The coloured softening with extravasation of blood may present the preceding products, or only the mechanical imbibition of sanguinolent serum. This is ordinarily the case in recent apoplexies." I shall refer more particularly to the error of the first conclusion, when alluding to the colour of softenings.

The only other observation with which I am acquainted, is recorded by Vogt,† in his work on Softening of the Brain and Spinal Marrow. It is as follows:

Obs. XLIV.—"Not long ago there died in the Clinical Hospital a child with all the symptoms of acute hydrocephalus. At first there were frequent attacks of convulsive trembling of the limbs, incurvation of the thumbs, contractions in the fingers with tetanic rigidity of the inferior extremities, and in the muscles of the back. The speech was entirely lost, and, notwithstanding soporose attacks, especially in the night, during which the inferior segment of the cornea of both eyes became dry, and latterly quite turbid, yet the

* *Traité du Ramollissement du Cerveau*, par Max. Durand-Fardel. Paris, 1843.

† *Ueber die Erweichung des Gehirns und des Rückenmarks*, von. Dr. Ph. Fr. Wilh. Vogt, pp. 81 and 82.

organs of sense were in such a state as to enable the child to hear, to make movements with its trembling hands according as objects were presented to it, to distinguish drinks, &c. A short time before death the senses became extinguished, and symptoms of pressure on the brain became manifest. The convulsive and tetanic symptoms were always more severe on the right side. At the autopsy, independent of congestion, we found no change in the membranes of the brain, neither effusion in the ventricles, neither were these or the fornix softened. On the other hand, the whole brain was more moist and swollen, and became prominent (springing forward *hervor quellend*) on removing the skull-cap. Both *corpora striata* were softened. In the left *corpus striatum*, a spot the size of a bean was quite diffuent, and the parts surrounding it were softened to an inferior degree. On the right side the softening had only reached this lesser degree. All present at the section agreed that the pathological changes might readily have been overlooked, had not the examination been made with great care. Here was also seen under the microscope all the phenomena of Valentin's so-called second stage of softening, with the well-known corpuscles."

Remarks.—We here find inflammatory softening of both *corpora striata* causing tetanic convulsions and latterly resolution in the limbs. The phenomena were more marked on the right side, and the lesion was further advanced in the left *corpus striatum* than in the opposite one. The age of the patient is not given. It is worthy of remark, however, that in this instance only, the *corpora striata* were affected, whilst the central white portion of the brain was healthy. On the other hand, in a somewhat similar case previously recorded, (Obs. IX.) the gray masses were healthy, whilst the lesion was confined to the white matter. Why it should have struck all present, that a softening in the *corpus striatum*, containing in its centre a diffuent portion the size of a bean, would have escaped observation without extreme care, is to me inexplicable. If this be correct, it merely argues that the *post mortem* examinations in the clinical hospital at Bern must be conducted in a very loose manner.

Vogt tells us that the corpuscles described by Valentin as characterizing the second stage of softening were present. In other parts of his work also he alludes to observations made by Valentin. But in no place does he refer to where such observations have been published, nor does he even state that they have ever been placed on record. Here it must be remembered that they are both professors in the same university. Still, from his allusion to the opinions of Valentin, I ascribed to that anatomist the merit of having observed and described these bodies in inflammatory softening of the brain, (Journ. No. 153, p. 395), although I am only acquainted with his opinions through the statements of Vogt.

ON THE NATURE OF SOFTENINGS OF THE NERVOUS CENTRES.

The nature of softenings has been much disputed. Some attribute them entirely to chronic or acute inflammation, others, while they acknowledge that some softenings are undoubtedly thus produced, are also of opinion that they may occasionally depend upon other causes. Thus softening has been considered a lesion *sui generis* similar to what occurs in ataxic fever, (Recamier) ; to *gangrena senilis*, (Rostan, Abercrombie) ; to obliteration of the arteries, (Bright, Carswell) ; or to a diminution of nutrition, (Delaberge, Monneret.) It has also been referred to *post mortem* maceration, (Carswell, Paterson of Leith), and is undoubtedly often produced by mechanical violence after death. The difficulty hitherto has been how to distinguish with precision one kind of softening from another.

The observations detailed have shown that two varieties of softening undoubtedly occur. In the one the products of inflammatory exudation may be detected, in the other these are not present. It is necessary to determine with exactitude the distinguishing characters of these two kinds of softening, which may be denominated inflammatory and non-inflammatory softenings.

1. *Character of inflammatory softening.*—On placing a minute portion of the inflamed nervous structure between two slips of glass, then pressing them, so as to render it visible by transmitted light, and examining it with a magnifying power of 300 linear diameters, the following appearances will be observed. Besides the normal, tubular, and granular structure of the parts examined, there will be found, 1st, exudation granules coating the vessels, or floating loose, either isolated, or in the form of masses ; 2dly, exudation corpuscles, with distinct cell walls, sometimes nucleated as formerly described. The more pultaceous and diffuent the softening is, the more numerous are the granules and corpuscles. The nervous tubes and normal structures also then become more and more broken down.

The nature of inflammatory softening will become evident from what has formerly been stated. (Journ. No. 135.) It results from the active growth, development, and breaking down of nucleated cells, (exudation corpuscles,) in the effused blood plasma. It is not a mere maceration of the textures in serum. No doubt the serum performs an essential part in the process, inasmuch as moisture is necessary for every species of growth. But we are of opinion that softening cannot be considered as dependent on inflammation without the existence of these bodies. So far from being connected, as some have supposed, with diminished nutrition, it is, in point of fact, an increased nutrition in the excess of blood plasma effused. It would be out of place to enter upon the consideration of the facts which have led us to this conclusion. They

could only be appreciated by alluding to all the phenomena of inflammation, and discussing what we are really to understand by that term. I hope shortly to be enabled to lay my views on this subject in detail before the public.*

2. Character of non-inflammatory Softening.—Following the same mode of demonstration as that just described, we find that the cylindrical and varicose tubes of the part are rendered more soft and easily separable from each other. They have more or less lost their natural firmness and consistence; are readily torn across; the varicosities are easily enlarged by pressure, and, when separated or broken off, assume a globular form. The tubes also are more or less broken down into fragments. No exudation granules, masses, or corpuscles are to be detected.

The nature of non-inflammatory softening varies according to circumstances. It would seem to arise from four causes; *1st*, From mechanical violence in exposing the nervous centres, (Obs. XVI., XXII., XXVI.) *2d*, From a mechanical breaking up of the nervous tissue, by hemorrhagic extravasations, whether in mass, (Obs. V., XIV., XXIII.) or when infiltrated in small isolated points, constituting capillary apoplexy. (Obs. XV., XXXIII.) *3d*, From the mere imbibition of effused serum, which loosens the connection between the nervous tubes, and diminishes the consistence of the nervous tissue. (Obs. XIX., XX., XXXII.) *4th* From the process of putrefaction.

Dr Paterson of Leith, in a paper on Pseudo-morbid softenings,† after alluding to the frequency of these without any symptoms indicating their presence, has shown by a series of experiments that the brain rapidly imbibes fluid, and becomes, in consequence, unusually soft. The facts he has communicated with reference to this subject are very valuable. But the manner in which he endeavours to separate the inflammatory from the non-inflammatory softening is most unsatisfactory, and might be shown from the result of our researches to be erroneous. For instance, he observes “softenings may be considered then the result of inflammatory action, when they are surrounded by a zone of red vessels with small coagula, or if the softened portions are infiltrated with purulent matter.” Now the zone of red vessels is very rarely seen in inflammatory softenings, and the infiltration with purulent matter, to which, following Lallemand, Dr Paterson alludes, has no real existence so far as my observations have hitherto gone. On the other hand, the circumstances he mentions as characteristic of pseudo-morbid softening, we have seen to occur in Obs. VIII and IX. although the lesion was undoubtedly inflammatory. It is only

* An abstract of these will be found in the Lond. and Edinb. Med. Journ., December 1842, and Microscopic Journal, Vol. ii.

† Ed. Med. and Surg. Journ., Vol. lvii. p. 110.

the microscope, then, that can enable us to distinguish with certainty one from the other.

As regards the difference supposed by some to exist between the softening in adults and that in old persons, I fully agree with M. Durand-Fardel, when he observes, "that cerebral ramollissement is the same malady in old persons as in adults; that it presents no other differences than the modifications which a great difference in age always produces, connected only with the form and not with the nature of the lesion." (Op. cit. p. 166.)

The previous observations offer no argument or proof in favour of the opinions which attribute softening to a lesion *sui generis*, to diminution of nutrition, to gangrene, obstruction of arteries, &c. all which explanations appear to us hypothetical in the highest degree.

The details entered into in the different observations not only demonstrate the existence of inflammatory and non-inflammatory softening histologically, but indicate that the symptoms which accompany them are widely different. Thus in the twenty-four observations hitherto recorded, in which cerebral softening was observed, exudation corpuscles were present in eighteen, whilst in six no trace of these bodies could be found. Again, in the eighteen cases of inflammatory softening, there are four in which there also existed in another part of the brain non-inflammatory softening. On analyzing the symptoms of these cases, we shall find a marked difference between those accompanying the one lesion or the other. Thus in the fourteen cases where only inflammatory softening was present, well-marked symptoms invariably existed, such as loss of consciousness, preceded or followed by dulness of intellect, contraction and rigidity of the extremities, or paralysis.

Very different were the symptoms in the six cases where the lesion presented the characters of non-inflammatory softening. In three of these there was a large extravasation into one side of the brain, followed by sudden coma and hemiplegia, (Obs. XIII. XIV. XXIII.) In the fourth and fifth cases there was sudden loss of consciousness, with convulsions, but no paralysis or contraction, and on dissection capillary apoplexy with central softening was found, (Obs. XV. XXXIII.) In the sixth case there was also extensive softening without any effusion of blood whatever, and no disturbance of the intellect, no contraction or paralysis, (Obs. XIX.) I consider, then, that the softening was occasioned by mechanical destruction of the tissue in the first three cases, and by *post mortem* action in the three last. That this conclusion is the correct one will further appear from the following considerations.

Of the four cases where both kinds of softening existed, in the

first, hemiplegia was present on the left side only. After death softening was found in both *corpora striata*, yet exudation corpuscles were only detected in the lesion of the right side, the one opposite to the paralysis, (Obs. IV.) In the second case there was loss of speech, disorganization of the eye, and convulsions before death. There was no paralysis; the man could walk without assistance. Abscesses surrounded by inflammatory softening existed in one hemisphere, explaining the symptoms present. But the central parts of the brain were also softened, causing no symptoms whatever, and on examination this lesion was found to be non-inflammatory, (Obs. XX.) In the third case there was paralysis of both arms, contraction of the right, and tetanic spasms of the muscles of the mouth and neck. Inflammatory softening existed in the *pons Varolii*, extending more to the left side, which perfectly explained the symptoms. There was also softening of the right *corpus striatum*, probably mechanical, certainly non-inflammatory, connected with which no symptoms existed, (Obs. XXII.) In the fourth case there was cephalalgia, prominence of the eye-ball and coma before death; there was no paralysis. After death a fungoid tumour was found at the base of the orbit, and an abscess in the anterior lobe of the brain, surrounded by inflammatory softening. There was also central yellow softening of the left hemisphere, producing no symptoms, (Obs. XXXII.)

An analysis of these ten cases, therefore, leads to the conclusion, that the two kinds of softening we have endeavoured to establish are alike distinguishable, both by their intimate structure and the symptoms accompanying them during life.

SOURCES OF FALLACY IN THE PRESENT METHOD OF EXAMINING LESIONS OF THE NERVOUS CENTRES.

I shall now inquire how far the observations tend to elucidate the obscurity which confessedly surrounds the pathology of inflammation of the nervous centres. All practical men agree in considering it a matter of extreme difficulty, to reconcile with any certainty the morbid appearances found in the brain, with the symptoms previously observed. The microscopic examinations described serve, in my opinion, to demonstrate some of the sources of error connected with this subject, which in future may readily be avoided. For instance, softening of the *fornix*, *septum lucidum*, and central parts of the brain, may exist in two cases; to the naked eye they may be in every respect identical, and yet the microscope enables us to determine that the one contains exudation corpuscles, whilst in the other not one of these bodies is to be found. It becomes evident, then, that we have hitherto been confounding two distinct lesions, and that a different train of symptoms should, under such circumstances, be occasioned, is on-

ly to be expected. Again, it has frequently excited surprize that, notwithstanding the existence of well-marked symptoms of softening, nothing was to be discovered after death. Now it has been shown in several instances, that although to the naked sight no morbid lesion was apparent, still, portions of brain might contain the same exudation corpuscles as are to be seen in more apparent lesions, and that, by considering such parts diseased, all the symptoms might be explained. By excluding these sources of error, therefore, and by being enabled at once to distinguish the lesion dependent on inflammation, from others which simulate it, we shall be enabled to obtain more exact data for future investigations.

It is not enough, however, to allude to these sources of error, as being *probable* occurrences ; it becomes important to establish the two following propositions :

1st, *That pathologists have hitherto confounded softening dependent on inflammation, with softening occasioned by post mortem changes or mechanical violence.*

2dly, *That, notwithstanding the most anxious search, and the existence during life of the most decided symptoms of softening, inflammation, though really present, has escaped observation.*

With respect to the first proposition it may be observed, that, in many cases where no symptoms were present during life, extensive softening of the brain has been found after death. This is a well-known fact, and is one which tends in no small degree to throw confusion on the pathology of nervous diseases. Thus

In Obs. XV. there was extensive softening of the central portion of the brain, *corpora striata*, and optic thalami, which, however, contained no exudation corpuscles. There was also capillary apoplexy. The symptoms were sudden insensibility and convulsions. There was no paralysis or contraction observed.

In Obs. XVI. and XXV. there was circumscribed pultaceous softening of the spinal chord, with absence of exudation corpuscles. There was no paralysis, and the symptoms were those of general tetanus.

In Obs. XIX. there was extensive softening of the central parts of the brain, with absence of exudation corpuscles. The only nervous symptoms were hemicrania and delirium ; no paralysis or contraction.

In Obs. XXXIII. there was softening of the central white substance, and the *corpora strata* were broken up by sanguineous infiltration. No exudation corpuscles or granules were present, and the symptoms were, sudden insensibility, convulsions, coma, and death, without paralysis or contraction.

Now, in all these five cases there was an extensive softening, which it was impossible for any one to distinguish positively by

unaided sight, from inflammatory softening. In neither did exudation corpuscles exist, and it is curious that in neither did those symptoms occur which we shall afterwards find are peculiar to similar softenings produced by inflammation.

Here again I may allude to the four cases formerly noticed, (Obs. IV., XX., XXII., XXXII.) where, conjoined with an inflammatory softening, producing particular symptoms, there was also non-inflammatory softening, occasioning no symptoms whatever. The circumstances attendant on these nine cases, then, must convince us that softenings, produced mechanically, or by *post mortem* changes, have frequently been mistaken for those dependent on inflammation, and must necessarily be so, so long as unaided sight is made the sole means of forming a judgment with respect to their nature.

These cases, therefore, I think sufficient to establish the first proposition, viz. that pathologists have confounded softening dependent on inflammation with softening occasioned by *post mortem* changes.

The second proposition, namely, that, notwithstanding the most decided symptoms of inflammatory softening were present during life, and the most careful examination after death, the morbid lesion, though really present, has frequently escaped observation, is clearly established by the following facts.

In Obs. V. a man had paralysis with complete resolution of the limbs on the right side, and intense rigidity of them on the left. Death occurred in six hours. On dissection, a large coagulum of blood was found effused into the left hemisphere, thus explaining the paralysis on the right side. In the right hemisphere an old apoplectic cyst was found, and a number of small cavities, described by Dr Sims as chronic softening undergoing a cure. Here, then, there was nothing acute, nothing to explain the intense rigidity. A microscopic examination demonstrated that these cavities were filled with numerous exudation corpuscles and granules, similar to those found in undoubted inflammatory softening.

In Obs. VI. a man, who had long suffered from a tumour at the base of the brain, was seized, ten days before death, with loss of consciousness, and powerful rigidity of the right extremities. The latter symptoms disappeared in three days, leaving perfect paralysis of the right arm, but, four days subsequently, again returned. On dissection nothing could be observed in the left hemisphere, after the most careful examination, and yet the microscope enabled us to discover numerous exudation corpuscles in the left *optic thalamus* and *corpus striatum*, showing that these bodies were inflamed.

In Obs. XXII. there was hemiplegia of the left side with contraction of the arm, followed by hemiplegia of the left side. There

were also trismus and tetanic spasms of the neck. It was very doubtful on making a section of the *pons Varolii*; whether it was softened or not, its colour and consistence were apparently unchanged. Yet here, again, the microscope demonstrated to all present that numerous exudation corpuscles existed in the part.

What renders these cases so remarkable and satisfactory is, that they are not instances where the dissection was performed in a hurried manner, and by incompetent persons. On the contrary, from the particular symptoms connected with them during life, the *post mortem* examination was in all conducted with extreme care. Drs Spittal, Henderson, and Paterson were each present during the dissection of their respective cases. Dr Peacock conducted the examinations which were witnessed by myself, several clerks, and numerous students, and I may say that we were all in doubt until the microscope cleared up the difficulty.

These observations, therefore, sufficiently demonstrate that the naked sight is positively unable to detect lesions, even although they are directly indicated by the symptoms, and carefully looked for by experienced morbid anatomists.

If, then, the two propositions formerly stated have been satisfactorily proved, and it is agreed that pathologists have been confounding inflammatory with non-inflammatory softening, and overlooking the former although undoubtedly present, it must be evident that many of the contradictions which have existed in connection with the pathology of nervous diseases may be accounted for. It must also be clear, that no confidence can be placed in the analysis of cases, however numerous, when the sources of error now indicated have not been carefully excluded.

The next step in the inquiry is evidently to determine what results may be derived from the thirty-three observations I have furnished, in conjunction with the twelve others recorded by Gluge and Vogel. An analysis of these might, if carried out, give rise in some instances to useful results, but would extend the limits of this paper to a great length. By some the number of observations may be considered as capable of forming the basis of a new inquiry into the subject, yet I have found, on making the attempt, that they are by no means sufficiently extensive to merit confidence, more especially in a semiological point of view. Reflection also has convinced me that it will be useless to proceed farther in any researches respecting inflammation in any particular organ of the body, without first having determined the nature and observed the phenomena of inflammation itself in a general rather than in a special manner. For the present, therefore, I shall content myself with making a few remarks on certain points only, which the preceding observations appear to me capable of eluci-

dating. These are, 1st, The colour of softenings; 2d, General relation between the symptoms and the seat of the lesion; 3d, Contraction of the limbs as a symptom of inflammatory softening; 4th, Curability of softening; 5th, The connection between softening and hemorrhage.

I. Colour of Cerebral and Spinal Softenings.—Softening of the nervous centres may be tinged red, yellow, white or gray, and present numerous intermediate shades of these. These distinctions, however, indicate no essential difference between them, as far as structure is concerned, for we have seen that all these coloured softenings present the same histological characters. As a general rule the red may be considered as acute, the yellow as sub-acute, and the white or gray as chronic softening. But this is by no means invariable, for we have seen one white softening to be acute, (Obs. IX.)

On what does the difference in colour depend? The red and yellow softenings are evidently connected with the presence of blood, or the greater or less imbibition of its colouring matter. In some cases blood becomes directly effused into the cerebral substance, constituting capillary apoplexy (Cruveilhier), or sanguineous infiltration (Durand-Fardel). In this case it may be of a bright vermilion colour, (Obs. XV. and XXXIII.) or of a purple colour, resembling port-wine lees, (Obs. XXI.) Sometimes a bright rosy blush is spread over a limited surface of the white matter, becoming gradually less towards the circumference, (Obs. I.) This depends upon congestion of the vessels of the part. Occasionally the redness is surrounded by a straw-yellow colour (Obs. X.), or it may be of a rusty-yellow or ochry tinge, as seen surrounding apoplectic extravasations, (Obs. XII. and XIII.) In this case, the blood-corpuscles being broken down, the colouring matter tinges the serous fluid, and gradually permeates the surrounding tissue, (Carswell.)

It may not perhaps occur to many that the real colour of the blood is yellow, yet that this is the case will become evident on examining an isolated blood-corpuscle under the microscope. It is only the number of the corpuscles, or, in other words, the intensity of the yellow which gives it the appearance of redness, as occurs with the tincture or syrup of saffron. The colour which is apparent to the eye is often different from what really exists. Thus a deep-green or Prussian-blue looks black. It is only when diluted that the real colour becomes evident. Hence why, when blood is diluted or diffused over a considerable space, the parts assume a yellow tint, more or less intense.

Sometimes the yellow softening is contained within the reddened portion, and somewhat resembles a purulent collection, (Obs.

I.) At others it surrounds the extravasation of blood as is most common. Occasionally we find considerable portions of the white matter tinged of a straw colour, either in connection with extravasated blood, (Obs. X.) or with an abscess (Obs. XXXII.) Lallemand and many others have supposed that yellow softening is caused by the presence of purulent matter, and to the naked eye the resemblance to a purulent infiltration is often very great. In none of the observations detailed, however, does it appear that the colour or consistence of the softening is in any way connected with the presence of purulent matter. I have never yet seen a pus corpuscle in softened brain or spinal marrow. M. Durand-Fardel maintains that the colour is always derived from the blood. It is difficult, however, to account for it when no blood is extravasated, (Obs. XXXII.) In cases where it is conjoined with an abscess, may not the colouring matter of pus be also absorbed?

Fawn-coloured softenings are frequently observed, independent of extravasated blood. As they are generally subacute or chronic, it is of course impossible to determine how far the tint is dependent on the admixture of blood. I have always found exudation corpuscles in these softenings, and think it very probable that the fawn tint occurring in the medullary matter is attributable to the presence of these bodies, which are usually of a brownish or blackish colour.

The softening may be brilliant white, and yet contain numerous exudation corpuscles, which, however, in this case are colourless. (Obs. IX.) In the softening which resembles chalky milk, the white has a dull appearance, and the granules of the exudation corpuscles are large, equal in size, and very transparent. (Obs. XVII.) I have never yet seen a pus corpuscle in them,—a result entirely opposed to the opinion of Gluge, who considers this a common occurrence. His statement, however, is not supported even by his own cases. White softenings in the great majority of instances are non-inflammatory.

II. *General relation between the symptoms and the seat of the inflammatory softening.*—Deducting all the cases of non-inflammatory softening with which no symptoms were connected, and those also of simple hemorrhage, we may divide the remaining 20 observations into three groups.

1. Lesions of the central parts of the brain on one side, ten cases, (Obs. I. II. III. IV. VI. VIII. XI. XII. XIV. XVII.)

2. Lesions of the central parts on both sides, six cases, (Obs. V. VII. IX. X. XVIII. XXII.) In this group is included the case of softening of the *pons Varolii*, (Obs. XXII.)

3. Lesions only of the peripheral parts. On one side three cases,

(Obs. XVIII. XX. XXXI. On both sides, one case, Obs. XXI.)

Each of these groups will be found connected with a particular train of symptoms. Thus, the first group is characterized by contraction or paralysis of the extremities on the opposite side of the lesion. The second group is characterized by the same symptoms on both sides, and the third group is characterized by absence of contraction or paralysis in the extremities and by either delirium or coma.

This analysis, therefore, favours the view which supposes the central parts and base of the brain to be connected with motion and sensation, and the peripheral parts to be connected with intelligence. With respect to the influence of more circumscribed parts, such as the optic thalamus and *corpus striatum*, no positive deductions can be drawn. For this purpose I consider the observations too few, and the microscopic examinations with respect to them not sufficiently exact.

I regret that the want of detail which accompanies Gluge's cases, precludes the possibility of drawing any conclusion from them with respect to the relation between the symptoms, and the seat of the lesion. Obs. XXXIV., for instance, is as follows: "Female, paralysis; pultaceous softening of several points of the cerebrum and cerebellum, both in the gray and white substances."

III. *Contraction of the limbs in inflammatory softening and in hemorrhage.*—Whilst by some more or less contraction and rigidity of the limbs has been considered as highly characteristic of inflammatory softening,—others have maintained that it is altogether incidental, that it often exists when no softening can be found, and that it is as often absent when softening is present. It has also been known to accompany hemorrhages, apparently unconnected with softening. May not this confusion be dependent on the two propositions which we have endeavoured to establish not having been known? Let us then examine what result an analysis of the observations will afford us in connection with this point.

Cerebral and spinal softening was observed in 26 cases. Of these 19 were inflammatory, and 7 non-inflammatory. Of the 19 cases of inflammatory softening, 16 were acute, and 3 chronic. If from the 16 cases we subtract 2 of apoplexy, (Obs. XI., XII.) and 4, connected with external lesions, (Obs. XIII., XX., XXI., XXXII.,) there remains 10 cases of idiopathic inflammatory softening. Of these 7 cases presented well-marked contraction, and in 3 this symptom was not observed, (Obs. IV., VIII., XVIII.) But in the first of these three cases, three days elapsed before the medical man was called in. In the second case, the symptoms

were avowedly not accurately observed, and in the third case no mention whatever is made either of the presence or absence of contraction. It may be argued, however, that as this last case, (Obs. XVIII.) was in the Infirmary some time previous to the cerebral attack, this symptom, if present, could not have escaped observation. Be this as it may, it offers the only doubtful exception to the occurrence of contraction in acute inflammatory softening. This analysis, therefore, indicates that contraction is a more frequent symptom of inflammatory softening than many suppose.

This result becomes more important when we find it stated that contraction is a frequent phenomenon in cerebral hemorrhage.* In eight cases of this lesion, recorded among the foregoing observations, contraction was not once observed. M. Boudet has laid down the following proposition: † viz. "every time a hemorrhage takes place in the cerebral substance, contraction is not manifested so long as no inflammation is occasioned round the clot. But when to a lesion of the cerebral substance is joined a rupture of the walls of the ventricles, and an extravasation of blood into their cavities, or on the surface of the brain, contraction appears." Durand-Fardel admits that this is frequently the case, but not always. In Obs. XIV. there was hemorrhage into both ventricles, and in Obs. XXIII. into the left ventricle, yet in neither of these cases was contraction present. Again, in Obs. XIII. there was considerable hemorrhage into the arachnoid cavity, with the same absence of contraction. All three observations, therefore, are opposed to the proposition of MM. Boudet and Durand-Fardel.

The latter author, however, has recorded sixteen observations, where contraction was well-marked during life, and where cerebral hemorrhage was found after death. He says nothing, however, of the nature of the lesion surrounding the extravasations, and it is possible that in those cases the hemorrhage may have been preceded or accompanied by an inflammatory softening. This is a point which could only be determined by a microscopic examination. In the eleven cases mentioned by Gluge, the occurrence of contraction is only mentioned twice. In one there was extravasation of blood into, and softening of the left ventricle, (Obs. XXXVII.) But it is distinctly said that exudation corpuscles in great quantity were present. In the other case, (Obs. XXXVIII.) there was deep-red softening of the right hemisphere, also containing exudation corpuscles. We are of opinion that the contraction in both instances is attributable to the inflammation, and not to the accompanying hemorrhage. Without, therefore, denying the possibility of the occurrence of contraction

* Durand-Fardel, *Archiv. Gen. de Med.* Juilliet, 1843.

† *Memoire sur l'Hemorrhagie des Meninges*, 1839.

from simple hemorrhage into the brain, it still does not appear to me that the absence of inflammation in the cases given by Durand-Fardel has been demonstrated.

IV.—*The curability of Cerebral and Spinal Softenings.*—Durand-Fardel observes that the curability of cerebral ramolissement is a fact of which we can no more entertain disbelief in the present day, than we can of the curability of pulmonary tubercle. There can be little doubt that the observations of Rostan, Cruveilhier, Sims, Dechambre, and Durand-Fardel have fully established the possibility of this occurrence. Besides, why should not exudation of blood-plasma into the brain, and the softening there produced by the formation and development of exudation cells, lead to absorption in that organ, as well as in the lungs? We cannot help thinking, however, that the anatomical marks or appearances, by means of which pathologists have endeavoured to *demonstrate* the curability of a softening are very fallacious. The slight indurations occasionally met with in the nervous substance are spoken of by some authors as *ricatrices*,—a term we think wholly inapplicable to them. Durand-Fardel alludes to the softening resembling chalky milk as a proof of the passage of the lesion into a state of cure, and Dr Sims speaks of the fawn-coloured cavities as evincing the same fact. Now, we have seen (Obs. XVII.) that the chalky milk softening contains exudation granules and corpuscles, and that both presented a peculiar appearance. This was a very chronic case, and the symptoms exhibit that the lesion was connected with a hemiplegia of long standing. It is certainly probable, therefore, that the opinion of M. Durand-Fardel is correct, and that the granules composing the softening were undergoing absorption. On the other hand, the lesion described by Dr Sims we have seen (Obs. V.) also to present exudation corpuscles, exactly resembling those in acute inflammations. In this case there was intense rigidity of the opposite side of the body, without any other lesion but the one under consideration, which could have produced it. So far as one observation goes, therefore, the appearance described by Dr Sims cannot be regarded as a trace of cured cerebral softening; and we are further inclined to think that a critical analysis of his cases will not support such a view, even as regards a diagnosis of the disease. At present, however, I content myself, in the absence of further facts, with pointing out the above discrepancy.

V. *The connection between Softening and Hemorrhage.*—The relation between softening of the nervous tissue and hemorrhage has excited much attention. Does the hemorrhage precede and cause the softening, or, on the other hand, does softening ever

precede and induce hemorrhage? There are eight cases which bear reference to this question, (Obs. V. XI. XII. XIII. XIV. XV. XXIII. XXXIII.) Three of these were well-marked cases of sudden hemorrhage into one hemisphere of the brain, causing complete hemiplegia on the opposite side of the body, (Obs. V. XIV. XXIII.) In these cases death took place respectively in six hours, two days, and eight days after the attack. Surrounding the coagulum, the cerebral substance was soft and broken up, apparently from mechanical violence, and contained no exudation corpuscles. In two other cases, similar symptoms were occasioned, and similar lesions found after death, (Obs. XI. XII.) In these death took place respectively in seven days and five weeks. Here also the cerebral substance surrounding the clot was soft and broken up, but contained numerous exudation corpuscles and granules. Thus it would appear necessary for a certain time to elapse before a coagulum of blood can excite consecutive inflammation. In the five preceding cases the hemorrhage occurred into the ventricles, or involved the optic thalamus and *corpus striatum*, producing hemiplegia on the opposite side of the body. In the sixth case, on the other hand, where the hemorrhage followed a blow on the head, the arachnoid cavity was the seat of the lesion. Here there was no paralysis, the man walked perfectly the day before his death. There was, however, great restlessness and delirium, and the periphery of the brain in contact with the clot, was found softened, and contained exudation corpuscles. Death took place thirteen days after the accident. The seventh and eighth cases are instances of capillary apoplexy combined with central softening, which, however, was non-inflammatory.

On examining the mode of accession in the eight cases, we can perceive no reason for supposing that softening or other organic lesion preceded the hemorrhage. In Obs. XV. the apoplectic attack was ushered in by severe cephalalgia, more or less intense, during a period of four months. This, however, occurring in a young girl, was evidently congestive, in no way accompanied by inflammation, and the softening discovered after death contained no exudation corpuscles or granules. In the other seven cases the attack was sudden. We cannot doubt, therefore, that the inflammatory as well as the non-inflammatory softening surrounding the hemorrhagic extravasations in these cases were in all of them consecutive.

It has long been a question how far the softenings, which usually accompany capillary apoplexy, are dependent on inflammation. In his Thesis, M. Durand-Fardel thus expresses himself, "In the same manner that redness is the most certain sign which can aid us in distinguishing acute from chronic softening, in the same manner diminution of consistence is the most positive proof of

the presence of inflammation in a sanguineous infiltration, and even the necessary condition, in order that its existence can be admitted.*" Again, in his recent work, he tells us, "if the softening extends beyond the precise limits of the sanguineous infiltration, if redness surround it, above all, if the blood infiltrated be not in sufficient quantity to have mechanically produced a diminution of consistence, there will be every probability that we have to do with a 'ramollissement,' properly so called, accompanied by sanguineous infiltration, that is to say, an inflammatory affection, and not one merely hemorrhagic. But if, on the contrary, the diminution be slight, and altogether limited to a sanguineous infiltration, if there be an adhesion of the meninges, if the surrounding parts appear perfectly healthy, there is only, doubtless, a simple and primitive sanguineous infiltration, as in the case where the consistence of the brain has remained normal.†" Now, in the two cases we have reported of this lesion, we find in one (Obs. XV.) that all the central white portions of the brain were very soft, and were diffuent. In the second case, (Obs. XXXIII.) the infiltration was more limited, although more intense, and the softening of the medullary substance not so great. Here, probably, M. Durand-Fardel would have considered that a simple or primary sanguineous infiltration only was present. But the distinctions by which this author endeavours to separate the inflammatory from non-inflammatory softening in these cases are very vague; its extent, more or less, the colour, adhesions of the membrane, these, certainly, are not marks which will enable the morbid anatomist to speak with precision on these points. On the other hand, let us regard the microscopic examination, and we find that the lesion in both cases adduced are identical. That there are none of the corpuscles we have invariably found in unequivocal inflammatory softening, and, therefore, we hold the lesion to be non-inflammatory. Then, when we regard the symptoms, we only find from the similarity of both, and absence of those which accompany inflammatory softening, a further confirmation of the same truth.

No doubt the observations which have been detailed are capable of furnishing data for many other discussions connected with inflammation of the nervous centres. There are also other lesions dependent on this morbid process, such as induration, the occurrence of abscesses and tumours, which have received little attention. The subject of arachnitis and the exudation of lymph has also been purposely avoided, as I consider such lesions to be more connected with inflammation of the serous membranes than of the nervous centres. As I am far, however, from considering the inquiry perfect, I shall now pause, with the intention of resuming it at a subsequent period.

* Thèse, 1840, p. 92. † *Traité du Ramollissement du Cerveau*, 1843, pp. 71-2.

The following conclusions may, I think, be drawn from the foregoing observations.

1. That two kinds of cerebral and spinal softening exist, an inflammatory and a non-inflammatory, which may always be distinguished from each other by means of the microscope.

2. That inflammatory softening is characterized by the presence of exudation corpuscles and granules, whilst in non-inflammatory softening these bodies are never found.

3. That the nature of inflammatory softening consists in the formation and development of nucleated cells in exuded blood plasma; whilst the nature of non-inflammatory softening consists in the mechanical destruction or maceration of the nervous tissue in serum, or is the result of putrefaction.

4. That non-inflammatory softening, unaccompanied by hemorrhage, is usually *post mortem*, and causes no symptoms; whilst uncomplicated inflammatory softening always causes marked symptoms, which, however, vary according to the seat of the lesion.

5. That the inflammatory and non-inflammatory softenings have frequently been confounded together by morbid anatomists, it being impossible to distinguish one from the other, with any certainty, by the naked eye.

6. That inflammation in the nervous centres has, in several instances, been demonstrated by means of the microscope, after it had escaped the search of good morbid anatomists, and been indicated by the most unequivocal symptoms.

7. That every different coloured softening has, at various times, been found to be connected with inflammation, but that yellow and white softenings are most frequently non-inflammatory, whilst the fawn-coloured softening is commonly inflammatory.

8. That red softenings usually depend on congestion, or the direct extravasation of blood; yellow softenings, on the imbibition of the colouring matter of the blood; fawn and gray-coloured softenings on the presence of brown exudation corpuscles; and white softenings, in the great majority of cases, are *post mortem* and the result of maceration in serum.

9. In no single instance has softening of the nervous centres been traced to the presence or infiltration of pus.

10. That inflammation of the central parts of the brain generally produce well-marked lesions of sensation and motion, whilst, in inflammation of the peripheral portions, lesions of intelligence are commonly well pronounced.

11. That in idiopathic inflammatory softening of the brain, contraction in one or more limbs is a common symptom.

12. That the fawn-coloured spots described by Dr Sims are no evidence of the cure of inflammatory softening.

13. That inflammation accompanying hemorrhages is usually consecutive.

14. The softening surrounding apoplectic clots or sanguineous infiltration is no proof of inflammatory action.

ART. XII.—*On the Nature, Locality, and Optical Phenomena of Musca Volitantes*. By JAMES STARK, M. D., F. R. S. E., Fellow of the Royal College of Physicians of Edinburgh.

DURING the last few years several essays have been published, both in this country and on the continent, with the view of explaining the causes and phenomena of the *musca volitantes*, and, in addition to this, almost every work treating of diseases of the eye, has devoted a separate chapter to the same subject. The mass of facts and of theories thus brought forward has been far from throwing much light on this interesting subject, almost all failing to demonstrate the truth of the theories they advance; and those who do demonstrate that which they describe depends on a particular structure existing in the eye, describe what is not a *musca volitans*, and has none of the characters belonging to that body.

Having paid no inconsiderable attention to this subject,—having, besides, had an opportunity of studying the complaint more than once in my own person, and having taken advantage of this circumstance to investigate fully its phenomena, causes, and locality, I have been enabled to arrive at conclusions which will explain every phenomenon, and render true *musca volitantes* capable of being at once distinguished from those fixed specks, nebulae, and the mottled indistinct vision of amaurosis and partial paralysis of the retina, which, even by the most eminent writers on this subject, have been mistaken for them.

As considerable confusion seems to exist, even in the writings of the very latest writers, as to what are *musca volitantes*, it is quite necessary that this be fully understood before we attempt an explanation of the phenomena, or assign their place in the visual organ. It was from not attending to this that even Sir David Brewster appears to have described, as a *musca volitans*, one of those fixed specks in the eye which have been so often confused with and mistaken for the objects in question.

Of all the late writers M. Prevost in his learned essay printed in the “Memoires de la Societ  Physique et d’Histoire Naturelle de Geneve,” has given the most accurate and characteristic description of *musca volitantes*; laying down characters, which, if attended to, will serve to distinguish them from all other kinds of specks met with in vision. “On looking fixedly (says M. Prevost) at a point which is well illuminated, (the sky,) and taking the fixed point at an elevation of 30° above the horizon, in a few seconds I see descend towards me, in the air, and over the object at which the eye

is fixed, a kind of shower of pearls. This movement of descent is slow, so that half a minute or so elapses before the whole shower falls. After this I see nothing ; but if the eye is, by a new effort, directed to a fixed point, the same objects seem to ascend instantaneously ; but so instantaneously, that I rather fancy I see this than actually see it ; immediately after this the objects begin to re-descend as at first."*

De la Hire, Le Roy, Demours, Donné, Bachelor, Sotteau, &c. all describe the general phenomena in somewhat similar terms, and all agree that the form of the bodies seen to move over the eye varies considerably, at one time being chiefly like strings of beads or of pearls or broken fragments, at others, globular bodies with dark centres and bright circumferences, or altogether of a dark colour, or altogether bright and luminous.

The writers in this country have confused these bodies with other and different objects to a much greater extent than their continental brethren ; to such an extent, indeed, has this been the case, that of the numerous writers on diseases of the eye, the justly celebrated surgeons, Mr G. J. Guthrie and Mr Benjamin Travers, appear to be almost the only ones who distinguish the true *musca volitantes* from the other objects with which they are so often confounded. As the later writers in this country, Mackenzie, Watson, Lawrence, Wardrop, &c. seem to have overlooked the distinctions laid down by these celebrated surgeons, we may be excused for quoting what they state.

Mr Guthrie shortly states that, " by *musca volitantes* are understood a variety of appearances moving before the eyes, such as small threads or filaments assuming the form of worms, zig-zags, or spots of greater or lesser dimensions, but generally small ; little globules or webs, or luminous spots sometimes surrounded by a halo, *which always move before the eye, and are never fixed*." " These spots always appear to sink below the axis of vision by their own weight when the eye is simply turned upwards."†

Mr Travers details the characters of the *musca* at much greater length. " *Musca* are either fixed, when they are usually allied to spectra, and belong to organic amaurosis ; or floating, when they are, I believe, characteristic of functional amaurosis, sympathetic or proper. I have known the fixed *musca* permanent without variation for years, darkening a certain defined portion of the field of vision. In some rare instances it precedes acute choroid inflammation ; more frequently it is unconnected with any particular morbid state. Around the opaque spot persons have sufficiently distinct vision. The spot varies in density in different individuals, and under a long but gentle mercurial course, I have known it to become considerably less dense so as not to intercept bright light."‡

" The *musca volitans* is sometimes solitary, following the eye at

* Memoirs, &c. 1832. Vol. v. p. 243.

† Lectures on the Operative Surgery of the Eye. London, 1823, p. 209.

‡ Synopsis of Diseases of the Eye. 3d. Ed. London, 1824, p. 178.

a fixed angle as it passes along a line; sometimes two, three, or more are presented; more frequently an immense assemblage *descending in a cloud as the eye is raised*, and ascending as it is depressed." He then describes their form as resembling drops of soot, or wings of insects, transparent vesicles, minute globules of quicksilver connected like links of a chain, short hairs with bulbs to them, minute globes, or as flat and annular, resembling coins. Mr Travers then continues "almost every person has at some time or other seen these appearances, but especially those subject to dyspepsia and disordered functions of the stomach and liver. At the moment of approaching deliquium they appear in one vast cloud, and they are the harbingers of the intense bilious headach." "I mention these opposite and transitory states of emptiness and plethora, concomitant with the *floating musæ*, to show the purely functional origin of the affection."*

From the circumstance of the diagnostic mark of true *musæ volitantes* not being recognized, and their consequent confusion with fixed specks in the eye, or with the troubled mottled vision attendant on amaurosis, *musæ* have been usually regarded as one of the premonitory symptoms of cataract, glaucoma, amaurosis, &c. diseases which almost always lead to the loss of vision. The person, therefore, who is affected with these motes dancing before his eyes, and who consults a physician who is ignorant of the distinction between the *musæ volitantes* and the fixed specks (whether these fixed specks result from organic change in the structure of the clear parts of the eye or in consequence of certain spots of the retina becoming insensible to the stimulus of light), is apt to be kept in constant dread of losing his eyesight; and yet, until the true character of these motes is ascertained, he can have no certainty that such may not be the case.

The true *musæ volitantes* are not only met with in certain diseases of the eye, but are of pretty frequent occurrence in some fevers, and are very common in dyspeptics and hypochondriacs. In the fever patient they disappear as he recovers his health and strength; but in the dyspeptic they may become more or less habitual, and be attendant on him during a long life without ultimately leading to the destruction of vision, while they are capable of being removed at any time, on his being subjected to proper treatment.

Instead of detailing the symptoms and phenomena of this malady as I have seen it in others, I shall much more satisfactorily prove the conclusions at which I have arrived, by detailing my own case, as all the experiments and observations about to be detailed were made on myself; indeed, in no other way could I have arrived at so satisfactory an explanation of all the phenomena.

In April 1842, in consequence of continuing a severe course of study while labouring under influenza, and at the same time straining my eyes in microscopic pursuits, I was attacked with the phenomena of *musæ volitantes* to such an extent that the sight was quite obacured with the dark moving specks. As it was impossible

* Synopsis of Diseases of the Eye. 3d Ed. London, 1824, p. 180.

to continue my researches in this condition, advantage was taken of the opportunity thus afforded to study the phenomena of the maldy, and endeavour to ascertain its true cause.

The first and main point on which all the subsequent investigations must rest, was to determine whether the dark bodies really moved, or only appeared to do so in consequence of the movement of the eye causing the shade of the object to be projected on different parts of the sensitive retina. A large sheet of white paper was therefore fixed perpendicularly on the wall a few feet distant from where I sat, and one eye was directed to a spot marked in the centre of the sheet of paper. When this was done the whole paper was seen scattered over with dark specks varying in shape and size, but all *moving*. It was immediately remarked that the general direction of all the specks was *downwards*; that all appeared to be falling more or less slowly in a perpendicular direction; but at the same time, that very many, if not all, did not fall quite perpendicularly, but had a gentle inclination towards one angle. By examining the descent of these bodies in each eye alternately, it was ascertained that, when the left eye was used, the bodies tended to the right, and that when the right eye was used the bodies inclined in their descent towards the left hand; or, in other words, that the bodies deviated slightly from the perpendicular towards the inner canthus of the eye. This was an important fact, because it tended to prove that the bodies, whatever they were, were not floating in a fluid, for in that case their descent would have been perpendicular.

The next point to be ascertained was the extent of motion of the moving bodies. When the eye was directed to the fixed spot in the centre of the sheet of paper, or to the clear sky, either unaided or by looking at it through a fine aperture, as a pin hole in a plate of metal, or through a minute lens, it was distinctly observed that the *musca* moved over the whole visual aperture; and that when the eye was kept steadily fixed, all the bodies gradually fell below the field of vision. On some occasions they took nearly a minute to do this, in others the descent was much more rapid, being completed in much less than half that time,—in both cases leaving the field of vision clear, provided the eyes were kept perfectly motionless.

The figure and colours of these objects next engaged the attention. It was immediately perceived that the figures of these moving bodies were very various, and, what was not a little singular, that the figure of each was more or less altered on each movement of the eye. The most common form in one state of the eyes was that of more or less regularly rounded or oval bodies, either scattered irregularly over the eye, or associated in small but variously sized masses, or united into broken irregular fragments of lines. Every motion of the eye caused these bodies to assume new shapes, but in the same state of the eye the general character of the bodies remained always more or less the same. When the eye in this state was directed to a white sheet of paper on the wall, or to the white wall itself, these bodies were seen of a dark colour, which gave them the appearance of particles of soot, of flies and midges, and of broken

particles of hair, or short tubes moving before the eyes. When the eye, however, was directed to the clear sky a very different appearance was presented. According to the clearness of the sky and the direction of the sun's light relative to the eye, these bodies appeared to be transparent or to have a slightly opalescent hue, or to consist of bodies with a clear centre surrounded by a bright halo, or with a dark centre and a luminous circumference, or they resembled little globules of glass, or drops of dew, or pearls, and when they were in short broken lines they resembled short strings of pearls, or of glass beads. In some particular lights each particle seemed a moving spark, so that the appearance presented to the eye was as if a shower of sparks, with irregular shaped particles of fire, danced before the eyes. All these varied appearances were seen at one and the same time by alternately directing the eye to different parts of the sky and wall. All evidently depended on the varying action of the rays of light on some material particles which were the undoubted cause of *musca volitantes*.

In other states of the eye the appearance resembled irregular wavy or zigzag lines; but when these were minutely examined they were found to consist of the rounded particles above described, being thrown into strings or rows, in which state they often closely resembled fine transparent tubes, filled with globular bodies; and where several of the globular bodies were heaped together, gave the idea of the tubes being thrown into a knot at that point. Whenever this peculiar cobweb or reticular appearance, as it may be termed, (*visus reticulatus*) was observed, it was remarked that their motion was much slower than when the *musca* consisted of irregular or rounded detached particles. In some cases, indeed, this was perfectly remarkable, the reticulations or lines scarcely seeming to move till the movement of the eye itself caused them to assume new arrangements. When, however, motion was observed among the lines, it was frequently remarked that one portion of a line would break off, and fall slowly as a detached particle, leaving the other portions to descend more slowly. This fact, which was very frequently observed, showed the correctness of the observation, that every one of these lines was made up of accidentally agglutinated particles,—a fact rendered still more evident to the senses by moving the eye, which had the effect of destroying completely the old arrangement of the particles, and throwing them into new, but still linear forms.

These lines, apparently according to the light admitted to the eye, presented all the varied colours above remarked, as being seen in the detached *musca*. It is well worthy of remark, however, that this varied mode of examination, viz. by presenting the eye alternately to a bright and to a darker portion of the sky and wall, satisfactorily established the fact of all these apparent lines being composed of more or less globular or rounded particles, agglutinated laterally, and having little cohesion to each other. In a very bright light they resembled strings of pearls, or of glass beads, or little balls of fire arranged in strings. Sometimes the centre of each separate particle was dark, whilst the circumference was surrounded

with a bright halo ; or it was strongly illuminated on one side, while the other was thrown into the shade ; or it was bright like a spark in the centre, whilst a faint shade surrounded it. As the lines slowly moved over the field of vision, it very frequently happened that one or more of these particles became detached, and either moved on more slowly or more quickly than the rest. As a line descended one portion of it would sometimes move more quickly than the other, when it would break asunder, and each portion continue its independent descent. Sometimes two lines would unite where they came in contact, form a thicker line, and, if the situation of the line were somewhat vertical, form a kind of ball or globe at its lower point, evidently at the expense of the line above, which would drop off, and more rapidly fall beyond the field of vision.

Having ascertained thus much relative to the figures and colours of the *muscæ*, the next object was to discover whether all the bodies moved, with the same rapidity, and whether their rate of motion was modified by the state of the eye. It was immediately observed, as above stated, that the rate of motion of each body was not uniform, and that some unknown condition of the eye had a most marked influence on the rapidity of motion of the bodies at different times. At one hour of the day they would descend so rapidly, that a quarter of a minute after the eye was fixed sufficed to allow the whole to descend ; while at another, after the lapse of nearly a minute, the greater portion were still visible. It was in especial remarked that when the dark lines or reticulations were chiefly seen, the motion was much less than when the other forms predominated. Generally speaking, a large body or speck was observed to move more rapidly than a small one ; but it was curious to observe that, in every case where a larger body passed so near a smaller one as to touch it, if it did not unite with it, and form one body, it rolled over it laterally, so that each body was seen during all the time of conjunction in all its original dimensions. This fact showed that the bodies were not moving in a free fluid, as in that case they would, in many cases, have passed each other in the same line of vision, without touching each other, and in such a manner that the one would have obscured the view of the other. Had they been floating in a free fluid they would not have rolled over each other laterally, so that both could always be seen of their original size during all the time of conjunction, but one would have often rolled before the other, so as to render it for the moment invisible. This fact, then, which was most satisfactorily and very repeatedly ascertained, proved that these bodies were moving over the surface of some of the membranes of the eye, over some surface where the quantity of fluid or of moisture was not of sufficient depth to allow the one particle to pass the other in any direction but laterally.

These facts, then, very much circumscribe the inquiry as to the probable seat of the *muscæ volitantes*. The fact just stated of the *muscæ* never crossing each other in the line of vision, but always rolling over each other's edges, so as to be visible in all their circumference during the whole time, precludes the idea of their being

bodies floating in a free fluid, like the aqueous humour, or liquor Morgagni,—the place which has been assigned as their seat by Demours, Donnè, Guthrie, Prevost, Bachelor, Sotteau, and many others, or in the vitreous humour, as endeavoured to be proved by Sir David Brewster. Besides this, the fact of these bodies moving with such very different rapidity at different times, and also tending towards the inner canthus of the eye, is quite inexplicable, on the supposition of their being contained in any of the fluid humours of the eye, either aqueous or vitreous, or that of Morgagni; as these fluids, so long as vision is perfect, must remain of the same quantity and density, and allow all bodies to sink in them perpendicularly.

The single circumstance of these bodies having been seen to move over the whole field of vision while the eye is fixed, (contrary to the vague negation of Dr Mackenzie and Sir David Brewster, who assert *muscæ* do not move, because they did not recognize a true *musca volitans*) of itself disproves the idea of their being seated in the vitreous humour, as endeavoured to be shown by Sir David Brewster, who mistook a fixed organic speck for a *musca*.

The single circumstance of these bodies not being fixed to one spot, but really moving over the whole field of vision, precludes the idea of their depending on enlargement, dilatation, or a varicose state of the vessels of the retina or internal parts of the eye, as supposed by Pitcairn, Travers, Wardrop, &c., or on paralysed spots, or spots insensible to light, on the retina, as supposed by Buffon, Mackenzie, and others.

Where, then, is the locality of *muscæ volitantes*? It must be apparent that the only place of the eye which could permit of the occurrence of phenomena such as those described must be on the conjunctival surface of the transparent cornea. If any minute body moving over this surface impinged on another, it would roll laterally over its edge, but not pass it either before or behind, so as to bring itself between the vision and the body it was passing. It is quite apparent that the small quantity of moisture on this exposed surface is never so great as to allow any minute body floating in it to pass between another body of equal volume and the membrane itself. If two bodies, then, met on this surface, the one while passing the other would never obscure it, but the two would be seen to touch and roll laterally over each other's visible edges, and either after this roll on together, or the larger mass continue its more rapid descent, and allow the other to follow more slowly. Besides, any minute body resting on this surface would occasionally exhibit a deviation from the perpendicular in its fall, in consequence of the excess of moisture on the eye tending to the inner canthus, as was occasionally observed to be the case with the *muscæ volitantes*.

The fact of the external surface of the transparent cornea being the locality of the *muscæ volitantes* was satisfactorily ascertained in the following manner.

The eye looking through a fine aperture in a plate of metal, or through a minute lens, was directed to the bright wall or a clear portion of the sky. It was then kept fixed steadily in one position till

the greater portion of the muscæ had descended below the middle of the axis of vision. The ball of the eye being still kept steadily fixed, the upper eyelid was brought slowly down till the obscuration by a dark body fringed with eyelashes, and marking its descent, arrived over the uppermost of the descending muscæ. The moment this was done, the body was arrested in its downward progress, and when the eyelid was allowed to elevate itself, those muscæ which it had covered were raised with it, and immediately thereafter began to redescend slowly as before. Those muscæ which were below the point to which the eyelid was allowed to descend, were not interrupted in their downward progress by the elevation of the upper ones.

When the eyelid was allowed to descend over the whole eye, and was then slowly elevated, the muscæ were seen to be elevated along with it, and scattered, as the eyelid passed over the eye, in irregular groups over the whole field of vision. Each elevation of the eyelid caused the muscæ which had fallen past the field of vision again to come within it, and then visibly redescend. Each elevation of the eyelid changed the general grouping of the muscæ. In every instance the descent of the eyelid arrested the fall of the descending muscæ, attracted them to its moist edge, elevated them along with it, allowed them to become detached during and after its elevation, and then slowly redescend.

One point of the inquiry still remained imperfect. Those who held that the bodies producing the appearance of muscæ existed in the humours of the eye, stated that the sudden motion of the eye itself was the cause of their ascent; that the motion of the eyeball agitated, as it were, the humours, and caused the particles floating in them to be dispersed through them, when their superior specific gravity caused them to redescend as soon as the eye was kept still. It was, therefore, necessary to ascertain whether motion imparted to the eyeball would re-elevate the muscæ which had fallen without receiving the aid of the eyelid.

After the eye was held fixed till the whole of the muscæ had fallen below the field of vision, the eyeball was tapped with the finger so as to agitate it, but the eyelid was kept carefully elevated. Not a single musca which had fallen was re-elevated in consequence. Occasionally a single new musca from above appeared, probably detached from the eyelid, in consequence of the motion imparted to the eye, but those which had fallen were never in consequence elevated, but their elevation was instantly caused by allowing the eyelid to close over the eye and be again elevated, as habitually takes place in winking. To ascertain the same point, after the muscæ had fallen below the field of vision, the eyelid being held fixed, the eye was first rapidly directed to the one side, and then rapidly back to its former position. If anything would have agitated the humours this would have effected it, but it produced no re-elevation of the already fallen muscæ. As, in the above experiment, a single new musca, probably detached from the edge of the upper eyelid in consequence of the motion of the ball below it, occasionally appeared,

but the shower or swarm of muscæ which had fallen were never by this means elevated.

These very satisfactory and conclusive experiments, made by myself on my own eyes when labouring under the malady in question, seem to prove, beyond the possibility of dispute, the locality of the true *muscæ volitantes*. They prove them to be situated neither in the humours of the eye nor yet in the retina or its vessels, but on the mucous surface of the transparent cornea.

Since April 1842, I have had one or two slighter attacks of the same malady, always brought on by overstraining the eyes in microscopic pursuits, during a course of severe study, and after considerable bodily fatigue; and, on each occasion, have been enabled fully to verify the above facts and conclusions. Had the specks or muscæ existed in the humours of the eye the eyelid could not have influenced their motion. Thus, if they existed in the humours of the eye, provided the eye were kept fixed steadily in one position, the allowing the eyelid to descend over it and be again elevated, would not have imparted any motion to the humours of the eye, certainly never could have imparted such a motion as to cause particles which had descended to their bottom to be dispersed through the whole tumour. Yet, however gently the lid is lowered and elevated, the whole field of vision is found thickly scattered over with muscæ, which slowly descend and disappear when the lid is held elevated, and do not re-appear, however much the eyeball and its humours may be moved or shaken, until the eyelid is again permitted to pass over the eyeball. Besides all this, had these bodies existed in the humours, whether in the aqueous, crystalline, or that of Morgagni, if the agitation of the eye were the cause of their elevation, we should have found them immediately after their shake floating about in every possible direction. This, however, has never yet been seen by me, and no one who accurately describes the true *muscæ volitantes* pretends to describe such an appearance.

What bodies, then, exist on the surface of the transparent cornea which could give rise to the phenomena of *muscæ volitantes*? In continuing my researches into the nature of the *muscæ volitantes*, and studying the motes in my eyes from day to day, I found, that, though they no longer affected my vision; that, though my vision was restored as acute and clear as it is possible for vision to be, yet the muscæ could be rendered visible whenever I wished by looking for them in the same manner as I had employed for the detection of their site and phenomena. They, however, no longer appeared as dark specks marring vision, but as bright transparent bodies, round or globular, which fell like strings or showers of pearls on elevating the eyelid. As I had been examining the bodies from day to day I could not be mistaken as to the objects which I now saw, being the very same as those which had given me so much annoyance when they troubled my vision as muscæ. What, then, were these bodies?

As I found, they existed in the healthy as well as in the diseased eye,—a fact noticed by Prevost so early as 1832, and confirmed by

the observations of Donné, Bachelor, Jurin, Sotteau, &c., it appeared to be the mode least liable to fallacy, to procure a few eyes, and examine the external surface of the cornea under a powerful microscope. When this was done with a recent eye I was delighted to find the whole surface scattered over with the mote-like bodies, which I instantly recognized to be nothing else than globules of mucus. I made use of this pleasant discovery to repeat, under the microscope, the observations I had formerly made with my own eyes. The microscope was fixed horizontally, so as to have the surface of the cornea vertical. A portion of the mucous lining of the eyelid was then moistened with water and passed rapidly over the surface of the cornea, below the microscope, when instantly the whole particles of mucus began slowly to descend, as I had seen them do in my own eye. The rapid evaporation of the moisture soon put a stop to their motion, which, however, was renewed on a fresh application of the moistened eyelid.

The varied colours which these bodies presented to the living eye, when affected by muscæ, were easily imitated on the surface of the cornea in the dead eye by throwing the light in various directions over the cornea under examination. According to the direction of the transmitted or reflected light the bodies were clear or dark, had bright or dark centres, bright or dark circumferences, or were illuminated strongly on one side, so as to resemble sparks, &c. ; when several globules of mucus lay in a line they, in certain lights, looked like a string of pearls. In fact, every appearance seen in the living eye was witnessed on the surface of the cornea under the microscope.

On one occasion, from inattention, a dry eyelid was wiped over the surface of the cornea, below the microscope, and nothing could have proved more satisfactorily the truth of the conclusions above arrived at ; for, in this case, instead of the globules of mucus being scattered irregularly over the surface, they were almost all drawn, or rather wiped, into fine streaked lines,—the exact appearance which my own eyes had presented in some particular states for which I could not then account. This fact, however, at once served to explain what I wanted. I had remarked that, when the lines were most numerous, their movement was much slower than that of the detached muscæ. The eye must therefore have been drier, and the deficiency of moisture both caused the lubricating mucus to be wiped by the eyelid into fine streaks, and left that mucus too little moisture to allow it to spread equally or more freely over the eye.

During last winter I had an opportunity of investigating this point more minutely. After making a number of different experiments with my eyes, when affected with muscæ, they got so fatigued as to become very painful, dry, and heated. The vision too got so obscured by the appearance of lines or reticulations that I could with difficulty distinguish objects. In the best manner I was able I examined the surface of the eye. There was a decided lack of moisture. In this respect, then, it perfectly imitated the cornea below the microscope, and the dry eyelid wiping over it swept the tough mucus into the fine streaks or lines which interrupted vision.

It instantly struck me that, if I could produce a flow of tears, it would prove or refute the truth of the theory I had formed. If the stream of tears converted the lines and threads into loose floating muscæ my point was proved; if not, I must seek for some other explanation. A very pungent snuff was therefore taken, the eye covered with its lines and threads was fixed in the proper position. I had just time to see they were there when a gush of tears swept over the eye, and floated off every line and thread as detached separate rounded muscæ; indeed, so effectual were the tears in removing the obstructions to vision that, so long as the eye remained suffused with moisture, I was scarcely annoyed by the muscæ, and when they did appear before the eye they passed over it so rapidly as scarcely to interrupt vision. Some days, however, elapsed before I perfectly recovered from this attack.

In order to furnish the most perfect evidence which it was possible to obtain relative to these bodies, it may be remarked that I have examined by the microscope the humours of the eye, with the view of ascertaining whether there were any bodies floating in them which could produce the phenomena of muscæ. I have never succeeded in detecting any.

These facts, then, serve to prove that *muscæ volitantes* are nothing else than the globules of mucus which lubricate the external or mucous surface of the transparent cornea. These globules are only rendered visible when the retina, or expansion of the visual nerve, is in an irritable state; and that it is so in all those cases in which this phenomenon is observed, is well known to every medical practitioner. It is, besides, a matter of common observation that the eye labouring under this malady feels uneasy and heated, and is unusually dry. This state would, therefore, render the mucous secretion more viscous than usual, so that the globules of mucus, instead of floating freely over the eye, would be wiped by the eyelid, and motion of the eyeball on the lid, into irregular wavy or zigzag lines or reticulations, and give rise to that appearance so often described as a net-work or cobweb before the eyes, (*visus reticulatus*.) The irritability of the retina is known to be induced by a great many causes. Two opposite states of the circulation will increase its irritability, viz. that of congestion from an overflow of blood to the part, or semistagnation of the circulating fluid in its vessels from want of tonic power to propel it. This is the reason why *muscæ volitantes* are not only seen in almost all affections of the retina, as in incipient amaurosis, retinitis, &c., but are also of very common occurrence in all dyspeptic complaints, the low stages of fever, &c. It is the circumstance of this malady generally attending the first stage of amaurosis,—a disease commonly leading to the loss of sight, which has made their occurrence be so much dreaded by all. It is the circumstance of so many practitioners confounding these moving muscæ with the fixed specks which depend on organic changes in the eye, (whether these arise from partial opacities in the humours, or their enveloping membranes, or depend on certain spots of the retina having lost their sensibility,) which has so often led them astray as to the cause

of their production, and induced them to regard their presence as an indication of the existence of some serious disease of the eye.

By attending to the characters laid down above no doubt can ever arise as to the true nature of the bodies which are met with in the eye, and disturb vision. Where *muscæ volitantes* are found uncomplicated with fixed specks, nebulae, or indistinct troubled vision, we can always satisfy the patient as to the innocuousness of the malady under which he labours, and free his mind from any anxiety as to his losing his sight. The diagnosis of the malady, then, is of no mean importance in practice ; for though the complaint is of itself simply annoying and unattended with danger to the sight, it is so often also an attendant on those affections which lead to the destruction of vision, that every means ought to be used to discover its true nature. If, with the moving harmless muscæ, threads, lines, reticulations, or showers of fire, there be fixed specks in the eye, deep-seated pain, clouded or mottled vision, and the other more ordinary symptoms of amaurosis or affection of the retina, it is high time that the most active remedies be employed, as the total loss of vision is threatened. But if these are wanting, and it be ascertained that the muscæ exist alone, general treatment is all that is usually required to restore the vision to its accustomed clearness. It is worthy of remark, however, that when once *muscæ volitantes* have appeared in the eye, they are scarcely ever got entirely rid of. Whether this depends on the eye becoming morbidly sensible to the globules of mucus moving over its corneal surface, or to the person attending more to the presence of such bodies and looking for them, or that the system once thrown into the condition which favours the appearance of these muscæ, is easily affected in a similar manner, has not yet been accurately ascertained. Certain it is that, in the eyes of those once affected with muscæ, even a trifling cause will produce their reappearance. A fit of indigestion, derangement of the bowels, overstraining of the eyes, &c. will, again and again, cause the reappearance of these troublesome visitors, and from these causes they may be seen at intervals, during the whole course of a long life, without permanently injuring vision.

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ART. XII.—*Notice of a Febrile Disorder which has prevailed at Edinburgh during the summer of 1843.* By DAVID CRAIGIE, M. D., &c.

FOR the last four months, or rather more, a febrile disease of a peculiar character, has been prevailing among great numbers of the labouring class of the population of this city. This febrile disorder is different from *typhus* and *synochus*, the usual forms of continued fever in Edinburgh and the neighbourhood, in several respects. 1st, It does not proceed in the same manner, or with the same kind of symptoms, being shorter in duration, but always almost showing a disposition to recur, in other words, the patients re-lapsing 2d, It

presents not the usual febrile eruption of red spots which takes place in typhus. 3d, It shows not the same tendency to violent disorder of the brain and its membranes, which, in several cases of genuine typhus, is observed to take place. And 4th, While it affects great numbers of people, it shows not nearly the mortality with which typhous fever is attended.

The mode in which this fever proceeds and its leading characters, may be understood by the following description.

The patient is attacked with loss of appetite, sometimes sickness and vomiting, and always thirst, accompanied or speedily followed by pains in the head, back, limbs, and joints generally, and an overwhelming sense of feebleness. When patients are examined in this state, they generally lie moaning as if from great distress and corporeal suffering, and when interrogated, answer that the whole body is in pain. The pulse varies from 90 to 96 or 104 on the first two days, with a sense of fulness and tension; but on the third or fourth it may rise to 120. The skin is at first hot and rather dry, but becomes more or less moist about the third or fourth day, yet without effecting a solution of the disease. The tongue is at first covered with a whitish moist fur, which afterwards becomes thicker and a little dry, assuming a colour slightly brownish. The patient is during the whole of this time, that is, for three, four, or five days, without sleep, and is restless; yet delirium is very uncommon.

The epigastric region is always tender or painful and does not bear pressure well. In a certain proportion of cases there is pain in the right hypochondriac region; in several there is pain in the left hypochondriac region; and, in a few, pain in the umbilical or infra-umbilical region, is the subject of complaint.

No eruption of spots is observed similar to that observed in genuine typhus. But, in a certain proportion of cases, an eruption of dark-red spots, like those of purpura, was observed on the persons of the patients. In some instances these bore so close a resemblance to flea-bites, that they were entirely disregarded or ascribed to this cause. In others, however, they appeared connected with the state of the individual's health. At length, it was impossible to doubt, from the frequent occurrence of these purple spots, that they were connected with the disease. They were seen in the first attack alone; and as that declined, these spots disappeared. They did not, so far as I am aware, appear in the second stage or relapse. In some instances the rose-red spots of typhus were observed; but these were regarded as instances of a fever quite different.

After the symptoms now mentioned have continued for four or five days, an abatement takes place about the fourth or fifth day, and becomes more complete on the sixth or seventh. Either in consequence of the use of medicine, or spontaneously, diaphoresis comes on, sometimes partially, sometimes generally and profusely; the patient shows the disposition to sleep; the tongue becomes moist, thirst abates, and the pulse becomes less frequent by about 10 or 12 beats, until in the course of twenty-four hours more, as the other symptoms subside, the pulse falls to its natural standard. As the change now mentioned proceeds, the pains in the head, back, and limbs in ge-

neral disappear, or at least are greatly abated. In some cases, however, they either are not abated, or they are actually aggravated, or, the original febrile pains subsiding, are followed by pains which present all the characters of rheumatism or rheumatic gout.

Appetite then returns, usually in proportion as the tongue becomes clean and moist ; and the patient is eager for food, which he takes with relish. In some instances much weakness, especially if the sweatings be profuse and continuous, is complained of, and the pulse is actually feeble and small. This state of convalescence proceeds for three, four, or five days ; and then most commonly without any distinct warning or preliminary signs, all the symptoms of fever are re-established, nearly in their original force, and continue for three, four, or five days longer. The appetite is gone, the patient is sick, or may even be attacked with vomiting ; headach is more or less severe ; the face is flushed ; the tongue is covered with the white moist fur, which speedily becomes thick, gray, or of a light-brown, and dry ; the skin is hot, the pulse quick, and the pains in the back and limbs are urgent, and the individual is restless and sleepless.

This state of symptoms continues about four, five, or six days more, at the end of which time the skin becomes moist, natural sleep returns, the tongue becomes more or less moist, and eventually more or less clean, the pulse falls, and the patient, though feeble, feels that appetite is returning.

In general, convalescence is now established without any accident or interruption ; the appetite is good ; food is taken with relish and easily ; strength returns, and all the painful feelings disappear.

The proportion of cases in which relapses or second attacks take place is very considerable, so great, indeed, that several observers believed that they occurred in all the cases. I find that, from accurate accounts kept of 182 cases, in 110 relapses had taken place, which is equivalent to 60½ per cent. exactly.

A third attack of febrile symptoms has been observed in a very small proportion of cases, I think not more than 3 in 346 cases, or less than one per cent. These third attacks were more frequent in Glasgow.

Such is the course in a large majority of cases. In a few, deviations from this are observed. One of the most remarkable, if not the most common, is more or less yellowness of the surface of the body and the conjunctiva, often with severe or even fatal symptoms. In the cases in which this symptom takes place, I have usually observed its approach in the following manner.

About the second or third day a faint lemon-yellow tinge is observed on the skin of the face, neck, breast, and belly, and in a very slight degree in the conjunctiva. This tint continues deepening on the face, neck, breast, and trunk generally, and also on the lower extremities, until the whole surface is of a brassy or turmeric-yellow colour. With this yellowness other symptoms were associated, such as sickness and vomiting, great feebleness, and stupor, in a degree more or less intense. Among the cases under my own care, this yellowness took place in eight cases, five females and three

males. In five of these it took place in a very great degree, and in four of these the disease proceeded to the fatal termination. In the other four in which the tint was less deep, recovery took place. In one only of all these cases was this yellowness accompanied by pain in any part of the belly, and by sickness and vomiting.

This occurred in a young girl of 16, named Mary Fraser. On the day of admission, 8th August, she had pain of the whole infra-umbilical region, so considerable as to require the application of leeches two several times. She had also pain and tenderness in the epigastric region and towards the right hypochondriac region, for which first a sinapism, then leeches were ordered to be applied. On the second day (9th August,) a fine lemon-yellow tint appeared on the skin, and was doubtfully perceptible in the conjunctiva. She had also sickness and vomiting, the matter vomited being of a dark grass-green colour. For these symptoms six grains of calomel with half-a grain of opium were prescribed, and the use of turpentine enemata. On the third day (10th August,) the yellow colour was much deeper, and the conjunctiva was now unequivocally yellow. Vomiting continued, the matter rejected being of a darker green colour, though not very abundant. The bowels had been scantily moved. The patient lay in a state of semi-insensibility, unless when roused by the sense of sickness and the act of vomiting. The calomel and opium were continued, as this seemed to be the only remedy which procured even temporary relief; and the turpentine enemata were repeated. On the fourth day the patient was so feeble that a little wine was deemed necessary. The yellowness was deeper and quite general. On the morning of the fifth (12th August) the patient expired. Inspection in this case was not permitted.

In other two cases, occurring one in an elderly female, the other in a middle-aged woman. noted, it was said, for her habits of drinking and other irregularities, the different organs were inspected with care, yet without throwing any clear light on the cause of the yellow colour. In the old woman who had presented first symptoms of bronchial disorder, the bronchial tubes were filled with much viscid blood-coloured mucus. The lungs were also loaded with dark-coloured bloody serum, and blood posteriorly. The stomach contained some yellowish-coloured fluid. The liver was a little compressed on its convex surface, but not unhealthy in its substance. The gall-bladder was filled with bile of a dark-yellow colour; the ducts were pervious, and bile of a light-yellow colour was observed in the hepatic duct. The intestinal mucous membrane was covered by viscid rather adherent mucus. The intestinal glands were natural. All the whitish textures presented a tinge of yellow.

In the middle-aged woman, Jean Macdonald, 35-38, who first showed symptoms of recovery and then became worse, with foul dark-coloured tongue, pain in the epigastric region and left side, and at length deep jaundice with insensibility; the stomach contained remains of food and wine, with much viscid mucus and some yellowish bilious matter; the duodenum was filled with matter tinged with bile, and the ducts were pervious; the liver was natural in structure but covered on its convex surface by a layer of old thick exudation converted into cartilage; the intestines general-

ly were natural; the spleen was softened; and all the white textures tinged yellow with bilious matter.

These cases with yellowness form but a small proportion of the amount. They were always dangerous, and most of the whole fatal cases have taken place among them. In only one case did recovery take place after the surface was deeply tinged yellow.

It is in vain to speculate on the pathological causes of this yellowness of the surface and the white tissues. It can scarcely be doubted that it arises from the presence of bile in the system. In one woman in whom it had not taken place sensibly on the surface, the blood when drawn presented distinct bile on its surface and in the serum. In the woman who recovered, Ann Campbell, the serum discharged by blisters applied to the scalp presented the usual characters of bile.

At the same time, it is clear that it is not from obstruction of the ducts that the bile is diffused over the system. It appears to be the result rather of what has been termed non-elimination, by which is to be understood, probably, incapacity of the liver to secrete or excrete the bile, as it is formed by small quantities in the blood.

The first indication of this form of fever began to appear about the end of March and the beginning of April. The usual cases of synochus and typhus had prevailed during the winter, though not to a great extent. Gradually, however, as the season proceeded, cases of genuine spotted synochus and typhus became less frequent, and cases presenting the symptoms already enumerated became common and numerous. Typhus, indeed, did not disappear; for from time to time well-marked, severe, and even fatal cases of the distemper ceased not to betray the existence of the disease, with its characteristic rose-red eruption, the violent affection of the nervous system, and the disorder in the organs of respiration. In a few cases even the eruption assumed a dark colour, the complexion was livid and dingy, the eyes heavy, turbid, and injected with dark-coloured vessels, and the disease terminated in fatal coma, showing the great affection of the lungs, the dark and unoxygenated state of the blood and poisonous influence on the organs. The great number, however, of cases consisted of those of the class already described, severe in onset, short in duration, with the tendency to recur, and often with rheumatic or arthritic pains. The increase in the number of applications was so considerable in the month of April, that it was found expedient to open another ward for the reception of males. The monthly admission of fever cases which, from October 1842 to the close of February 1843, had varied from 53 to 74, and had not been above the latter number, rose in March to 85, in April to 96, in May to 134, in June to 164, and in July to 251. In the months of May, June, and July 1842, the fever cases were respectively 76, 56, and 55.

Then all the attics were opened for convalescents, in order to give more accommodation for patients under the disease. As the season proceeded, the disease affected greater numbers, and as the applications for admission increased, first one ordinary ward, then another was set apart for fever cases, until it was found impracticable and inexpedient to proceed further in this sort of transmutation.

On Monday the 31st of July, when the total number of patients in the whole establishment, medical and surgical, amounted to 413, the number of fever cases alone was 213. At the same time, in 1842, the number of fever cases had not been above 55.

It was now deemed proper, as the Royal Infirmary could accommodate no more cases, and as from thirty to forty cases were unaccommodated, to apply to the public for funds to open the fever hospital in Surgeon's Square. Accordingly, in a few days, 3d August, this building was prepared for the reception of patients, and in the course of a week, 7th and 8th August, 55 patients, male and female, were received. The numbers afterwards rose to 60, and on the 4th of September they amounted to 85.

Meanwhile the distemper ceased not to spread; and though not fewer than 310 cases were accommodated in the Royal Infirmary and Fever Hospital, there still continued to be many applications for admission which it was impossible to answer. At the 21st of August, as there were still from 40 to 50 persons ill, for whom there was no accommodation, it was resolved to prepare another house in Surgeon's Square, belonging to the Infirmary, for the reception of patients, and by this means from 28 to 30 cases would be accommodated. At this time, 1st September 1843, when this second receptacle for fever cases is filled, and when not fewer than 350 cases are under treatment within the Infirmary and the two Fever Hospitals, there is still a demand for accommodation for 50 patients.

On the nature, nosological character, and causes of this febrile epidemic, it is, perhaps, premature to offer any opinion; for, at the present time, any thing that can be said must be more or less conjectural. That the disease is neither *synochus* nor *typhus* is manifest from the facts already adduced. At first some cases looked like influenza in the catarrhal character of the symptoms; and, in point of fact, catarrh was frequent and epidemic both in Leith and Edinburgh in the months of April and May. Independently, however, of the fact, that epidemic catarrh is never known to continue over the space of three, four, or five months, as this disease appears to have done, the symptoms do not present that exclusive affection of the organs of respiration which is observed in the majority of influenza epidemics. In many respects it presents the characters of a gastric, gastro-hepatic, or gastro-enteric disorder. In others, however, it appears to be of the rheumatic disposition, or at least to present a rheumatic complication. Thus, in several, if not many cases, the patients have suffered much from pains in the joints, large and small, and this, as much at the close of the disease, and after the febrile symptoms had subsided, as during its course. After the fourth or fifth day, for example, when diaphoresis was established, and in some cases became profuse, the pains in the shoulders, arms, and fingers were most excruciating, and in some instances they affected the whole body, so that the patient became quite helpless. This rheumatic complication has taken place both in the first attacks, and also in the second or relapses.

Some professional gentlemen, who have seen yellow fever in the West Indies, have said, that the cases with yellowness resemble

closely cases of yellow fever. It is, nevertheless, scarcely possible with any consistency in nosology or common observation, to admit even the resemblance. *First*, Yellowness took place in a very small number indeed. *Secondly*, It was not like the yellow colour of West India fever, most intense in the face, neck, and breast, and diminishing at remote parts; but it was apparently uniform and general. *Thirdly*, Vomiting was not nearly so common a symptom as it is in West Indian fever; and as to black vomit, it was seen in two or three cases only among the whole. *Fourthly*, As in the great majority of the cases, the disease was from five to seven days duration, though in many instances followed by relapse, and as the symptoms were in general disposed to subside almost spontaneously, it is scarcely possible to believe that the distemper we see here, can be compared in any of its essential characters with one so formidable and so fatal as yellow fever usually is.

When I saw the decided amendment about the fifth day, and the recurrence of the symptoms about the seventh, ninth, or eleventh day, I was disposed to regard the disease as a variety of remittent fever. This idea derived some confirmation from the mildness of all the symptoms about the third day. In many cases this mildness was very remarkable, in the headach being abated, the thirst being diminished, and the patient expressing himself free from complaint. The pulse was rarely much reduced. On the fourth, however, the symptoms were worse; and it was only on the fifth, or towards its close, that a decided remission was observed, and which again became more marked on the seventh day. I am doubtful, however, at present, whether it be possible to verify this idea as to all the cases. Unquestionably the distemper is unlike any febrile affection, which we have been in the habit of observing in this city; and if it turn out, that the characters now specified are uniform, it might be regarded as a gastric fever with remittent type.

Is there any ground to think that it is like the *suelle*, or sweating fever of Normandy. Diaphoresis was, about the third or fourth day, not uncommon, and often took place spontaneously; and about the fifth and sixth day it was profuse, and in some instances debilitating.

It has been stated in common conversation by various unprofessional persons, I believe chiefly, that the distemper is very fatal. This is not the fact. The mortality has hitherto been small, and though the distemper attacks great numbers of individuals, it certainly destroys few. I find that, from the beginning of April, not going farther back, to the present date, 15th September, 315 cases have been treated in my own wards, and of these 17 died, of whom 12 were from typhus.

I have said that the disease bears no resemblance to genuine typhus, and have specified, as accurately as possible, the diagnostic marks between typhous fever and the present epidemic. To show how small is the proportion of typhus cases, it was found, on Saturday the 9th September, that, among 364 cases of fever under treatment, or convalescent in the Royal Infirmary and two fever houses, 346 were cases of the epidemic, and only 18 cases of genuine typhus.

As to the causes of this distemper, it is not less difficult to arrive at anything like precise conclusions. It has been regarded as contagious, and, perhaps, it is so. But this is rather a presumption than a well-founded inference, and the mode in which the distemper proceeds is rather at variance with this conclusion. Thus, while it is well-known that continued fever is rather the disease of cold wet seasons than of warm seasons, and, consequently, is usually most prevalent in the winter, this distemper began to show itself at a time when typhus usually diminishes in prevalence, and it has gone on increasing and diffusing itself more and more extensively as the warm weather advanced. Then it has been very much confined to certain localities, which, though it cannot be denied that these are the most densely inhabited in Edinburgh, yet must be allowed to be very favourable for the origin and propagation of a disease depending on atmospherical causes. These localities are, the Grassmarket, the closes in the High Street, the Canongate, and Cowgate. On the other hand, a number of cases have been sent from Musselburgh, Tranent, Penicuik, Haddington, Dunbar, and similar situations, where the population is not dense, and where ventilation is excellent.

It must be observed, nevertheless, that it prevailed very much in families, and it rarely happened that only one member of a family was attacked. Thus, if a father or mother came in first affected with fever, then one or more of the children and the remaining parent very commonly were afterwards attacked.

I learned, some time ago, that a febrile epidemic quite similar in all respects to that which has been prevailing in Edinburgh has been at the same time prevailing in Dundee and in Glasgow. In Dundee the same symptoms, the same duration, and the same liability to relapse was observed; and, in like manner, several cases presented yellowness, and some patients with this symptom died. Among the latter I have been informed that one of the physicians who inspected several of the bodies found much the same appearances as those described by Louis in his account of the necroscopic appearances in cases of yellow fever.

The same form of fever has been prevailing also in Glasgow. The same kind of symptoms, the same duration, and the same tendency to relapse or recur, has been there observed. In certain cases, indeed, in that city three attacks of the symptoms have been recognized in the same individual. Yellowness has in like manner been remarked in various cases; and several of these, I was informed, have terminated fatally.

One circumstance in the Glasgow epidemic favours the idea of propagation of the disease by personal communication much more decidedly than I am aware that it has done in Edinburgh. In the former city many of the females employed as nurses were attacked by the disease. Of this we have little experience in Edinburgh. A few nurses were attacked, but in proportion so small that it is scarcely fair to make the circumstance the foundation of any positive inference. Only one clerk was attacked; and he presented the characteristic symptoms of the disorder.

It appears that a fever, similar to the present in duration and

course, appears to have prevailed at Dublin in 1806, and, according to Dr Bracken, at Waterford in 1817-18-19. *

As to treatment in general, after the use of one or two doses of cathartic medicine, the patients were left very much to the efforts of nature. At first, when the increase in numbers showed the approach of an epidemic distemper, after the exhibition of cathartics, I prescribed the use of the citrate of ammonia or saline julep with one grain of tartrate of antimony in twelve ounces of the mixture; and under this combination the tongue became clean, the skin moist, and the pulse less frequent in the course of three or four days. I found, however, that so great was the tendency to diaphoresis, that it was of little moment what was given, providing urgent symptoms and uneasy sensations were alleviated. Thus pure water or toast-water appeared as efficacious in promoting diaphoresis and procuring sleep as any other means. The patients, however, often spontaneously requested cream of tartar water; and this, with a small proportion of carbonate of soda, to facilitate the solution of the bitartrate, they got. In a very few cases was it requisite to apply leeches to the temples on account of the intensity of the headache. In general, when the hair was removed and cold applied, the pain rapidly subsided. When, after this, it did not, an active dose of cathartic medicine was administered.

At the crisis of the disease, when the sweatings were considerable, the weakness great, and rheumatic pains were excruciating, the best remedy I found to be the sulphate of quinine in two grain pills administered three, four, or five times daily. In some cases the debility was so considerable that it was necessary to order small quantities of wine for a day or two, till the appearances of returning strength were manifest.

For the cases in which yellowness took place, it was difficult to say what treatment was best adapted. Those in whom it occurred were persons of deranged health, in general aged, always debilitated. In the most marked and severe case which recovered, that of Ann Campbell, the treatment consisted in the repeated administration of turpentine enemata, calomel and rhubarb by the stomach, the application of one large blister on the coronal and vertical region, and then of another on the occipito-cervical, and afterwards of castor-oil when the power of deglutition was restored. Wine was also allowed this patient at the rate of four ounces daily. Under this method of management the yellowness slowly and gradually but completely disappeared, sensibility and consciousness returned, and convalescence was eventually established.

In other cases, in which the yellowness, though general, was less deep in shade, and the nervous system was less strongly poisoned, calomel in doses of six grains, with one grain of aloes, once or twice daily, followed next morning by a dose of castor oil, was found sufficient to remove the symptoms.

Another remedy was tried by my assistant, Dr Wood. This was the chloride of soda, in doses of twenty drops of the solution every second or third hour. Under its use the patients appeared to get rid of their symptoms in the course of two or three days, very much as by other means.

* Account of the Rise, Progress, and Decline of Epidemical Fever in Ireland. By J. Barker, M. D., and J. Cheyne, M. D. London, 1821. Vol. i. p. 211.

PART II.

CRITICAL ANALYSIS.

ART. I.—*On Gravel, Calculus, and Gout. Chiefly an application of Professor Liebig's Physiology to the prevention and cure of these Diseases.* By H. BENICE JONES, M. A. Cantab. Licentiate of the Royal College of Physicians, &c. 8vo. London, 1842, pp. 142.

MR JONES's work is divided into two parts, the first treating of gravel and gout, the second of the stone.

The first chapter considers shortly the peculiarities of the uric acid diathesis, but as nothing new is stated relative to it, and the subject has been so frequently, of late, noticed in this Journal, it seems unnecessary to waste time on it.

The production of uric acid from the albuminous tissues forms the subject of the second chapter; and in order to render his subject intelligible to the general reader, Mr Jones gives a short account of Liebig's views as to the causes which are supposed to hasten or retard these changes. The chemical affinity of oxygen for the elements of which the tissues are composed is supposed to be the cause of the change, but this can only take place when the vital force is weaker than the chemical affinity of the oxygen for the elements of the organized solid. It is assumed that the vital power requires a high temperature for its manifestation, but that it has its force diminished by muscular action and by cold, so that the supposed changes in the tissues will be greatly hastened and increased under muscular exertion and where the body is cold. The changes may also be hastened by increasing the quantity of oxygen in the system, as by increasing the blood globules, abstaining from non-azotized food, by giving an excess of albuminous food, or by giving alkali. From these statements it is concluded that an excess of oxygen, a low temperature, and much muscular exertion may be regarded as the causes of an excessive production of uric acid. It is assumed that the first change which the albuminous and fibrinous tissues undergo in consequence of the action of oxygen is their conversion into urate of ammonia and choleic acid. That when the uric acid is still further acted on by oxygen, it becomes converted into urea and carbonic acid, and if the urea be

still further subjected to oxidation it resolves itself into carbonate of ammonia. The choleic acid again is supposed, by the action of oxygen, to be converted into carbonate of ammonia and carbonic acid. No notice is taken of the ammonia of the urate.

As a proof of the correctness of this theory, is instanced the fact of the carnivorous animals exhibiting no deposit of uric acid in their urine, the whole being converted into urea in consequence of the animals living on albuminous principles alone and their systems absorbing much oxygen; while in the *Boa constrictor* the urinary secretions consist almost entirely of urate of ammonia, in consequence of the oxygen acting but feebly on the system. Urate of ammonia, under almost all circumstances, appears in the urine of man, in consequence of the quantity of non-nitrogenous substances in his food, which prevents the excessive action of oxygen on the tissues, except in phthisis and scurvy, which depend on the excessive action of oxygen on the tissues, and in which diseases the uric acid seems to be entirely converted into urea.

The third chapter treats of the production of uric acid from the gelatinous tissues. It is considered that the changes which these tissues undergo must be at their surface only, and as, generally speaking, these tissues receive a small supply of blood, and, of course, a diminished quantity of oxygen, if uric acid ever underwent no changes after its formation, it would naturally be expected to be met with as an acid in these tissues. Urate of soda has, accordingly, been found in the cellular tissue around the joints, in the cartilages of the joints themselves, and even secreted on the surface of the skin.

The ultimate composition of the gelatinous tissues is assumed to differ widely from that of the fibrinous, but this has not yet been satisfactorily proved. Liebig assumes that even chondrine and gelatine differ widely in composition. Thus the composition of gelatine is stated as $C^{32}, N^5, H^{27}, O^{12}$; and though no mention is made of the agent whose superior attractions would break up the vital affinities of these elements, it is assumed that, by giving off four atoms of oxygen, the remaining elements could assume the forms of urate of ammonia and of fat. Chondrine, on the other hand, assumed to consist of $C^{48}, H^{40}, N^6, O^{20}$, by giving off three atoms of oxygen, might assume the form of one equivalent of urate of ammonia, and half an equivalent of choleic acid.

From the circumstance of uric acid being found secreted with the urine in the gouty habit, it is assumed that that disease depends on a want of oxygen to effect the change of uric acid into urea. Neither Liebig nor his pupil, Mr Jones, have attempted to show the use of the free oxygen supposed to be evolved in the above changes, for if this oxygen, instead of being evolved, were to unite with the elements of the uric acid, not a particle of uric acid could by possibility be found, but urea only.

It is assumed, however, that, in the state of health, 1 equivalent of gelatin, 4 of water, and 2 of oxygen unite together, when, by a new arrangement of their elements, they form 1 equivalent of fat, 1 of ammonia, 2 of urea, and 6 of carbonic acid, and the occurrence of fat in the cellular tissue is instanced as a proof of the probable correctness of the supposition. It is hence concluded, that, whenever there is an insufficient supply of oxygen, uric acid may be produced by the metamorphosis of the gelatinous tissues.

The change which the uric acid undergoes after its formation forms the subject of the fourth chapter. If the uric acid were all excreted as such, says Mr Jones, the amount of change which occurs in the tissues could be estimated. But as that acid readily undergoes decomposition, it is converted into substances of great solubility, and thus prevents its amount being ascertained.

To allow of these changes taking place, it is assumed that both water and oxygen are required, and that their elements combine in certain proportions. Thus it is stated, that, if 1 equivalent of uric acid, 4 of water, and 2 of oxygen combine, they may become resolved into urea and alloxan. If 1 equivalent of uric acid, 4 of water, and 3 of oxygen unite, they may form urea and oxalic acid. If 1 of uric acid, 4 of water, and 6 of oxygen unite, they may ultimately resolve themselves into urea and carbonic acid. Such changes may be effected in the laboratory, and it is assumed that the same changes are effected in the animal body. Impure urate of ammonia, as seen in guano, was found by Dr Fownes to contain oxalate of ammonia, and a specimen of guano, which had evidently been longer kept, and had undergone decomposition, was found to consist of oxalate of ammonia, a little carbonate, organic matter, and water. The whole uric acid had disappeared, and been replaced by oxalic acid. Mr Jones subjoins a table, showing the probable mode in which the elements had combined to form these substances; 1 equivalent of uric acid, 4 of water, and 1 of oxygen, would form 2 of oxalic acid, 2 of ammonia, and 1 of carbonic acid. Mr Jones seems to have forgotten that this statement is in direct opposition to Liebig's theory, whose truth he wishes to prove, for not a particle of urea was formed from the uric acid of the guano by the changes naturally taking place during decomposition.

In all these changes the atomic constitution of urea is assumed to be $C^{10} H^4 N^4 O^6$; but its atomic constitution, as stated by Dr Prout, viz. $C^{11} H^4 N^4 O^6$, comes far nearer all the analyses of this substance which have yet been published.

The author shortly states Liebig's views, that the waste of matter and the production of animal heat are both dependent on the absorption of oxygen. Water is requisite to furnish its elements for the production of urea and alloxan, and also to keep the

matters in solution, that they may be more easily acted on by the oxygen; whilst the heat renders the chemical changes more rapid and more complete. In the state of health, these agents appear to be in such quantities as to change the greater proportion of or even all the uric acid; but at other times some of these agents may be deficient, and as it is scarcely possible for the water to be deficient, and the animal heat is nearly always the same, the oxygen must be the agent whose deficiency is the cause of the uric acid diathesis.

After some reasoning as to the quantity of uric acid which is thrown out of the body, and endeavouring to show that it depends on the quantity produced in the body, and on the quantity changed before it is thrown out, the author arrives at the conclusion, that "the quantity of uric acid thrown out of the body varies inversely with the quantity which undergoes a change in the body." As this change is assumed to depend on the quantity of oxygen absorbed, it is concluded that "the quantity of uric acid which is thrown out varies inversely with the amount of action of the oxygen." From these data it is that the theoretical cure of the uric acid diathesis is deduced; and the means proposed for its removal are, *1st*, To give a large supply of oxygen, as by exercise, cold air, and by medicines, as nitrous oxid water, and iron; *2d*, To diminish the quantity of other substances on which the oxygen acts more readily than on the uric acid, that is, substances consisting of hydrogen, carbon, and oxygen only. This is proposed to be effected by abstaining from such articles as food, and by removing them by aperients and by sudorifics. And *3d*, By keeping all the uric acid which is produced in solution by means of water and alkalis.

The author then shortly considers in detail each of these means of increasing the action of oxygen on the system; but as the very same ground is gone over in the next chapter, which considers the treatment of the uric acid diathesis, we shall notice them together.

And first of exercise, Liebig states that an increased amount of oxygen is taken into the body during exercise, because the respirations are more frequent as well as deeper; whilst, on the other hand, during sleep the amount of oxygen carried into the system is at a minimum. In the employment of exercise for the cure of the uric acid diathesis, it ought never to be carried the length of fatigue, but it is supposed to be more efficacious if it produces perspiration. Reading aloud has the same effect, for, though the respirations are not so frequent, they are deeper and more complete. Sleep ought not to be overindulged. Hot rooms should be avoided, as the heat dilates the air, and less oxygen is respired. It is stated that the little influence of warm countries, or hot weather on the uric acid diathesis, is probably owing to a smaller quantity of food being eaten, and to the perspiration being more free.

The nitrous oxide gas in solution in water is recommended on theoretical grounds, but no facts are stated as to its merits.

Liebig regards the red blood globules as the oxygen carriers, and as the number of these is said to be increased by the administration of iron, that metal is recommended.

The non-nitrogenous principles in the blood are, according to this theory, to be reduced to a minimum quantity. As it is supposed that the oxygen acts by preference on these substances, animal food ought chiefly to be administered, with a very small quantity of bread. "The quantity of starch in flour, says the author, as compared with animal food, renders it unsuitable to live only on bread. Meat alone would be far more beneficial." The quantity of food ought to be proportioned to the state of the body and the amount of exercise, and a little bread may be allowed, as in most people the process of respiration requires some substance containing no nitrogen. Potatoes and rice are mentioned as amongst the most inadmissible articles of diet, whilst, contrary to all precedent, greens and peas are allowed. Of fruits, apples and pears are alone condemned, as containing large quantities of sugar and starch; it is to be assumed, we suppose, that the others, though equally objectionable in a theoretic view, are to be allowed, because experience has found their utility. Fat and butter are both condemned, but soups and jellies allowed. The author is not altogether correct in stating that gum, sugar, &c., as soon as they are taken into the stomach, are absorbed as such into the veins, nor that starch is converted into sugar before being absorbed. Recent experiments seem to prove that all these substances assume in the stomach the acid form (acetic or lactic) and are in that form absorbed into the system.

As to drinks, the nitrous oxide gas water is recommended as preferable to all others, next to this distilled water, or water purified of its saline ingredients. Beer and wine are considered objectionable, on account of the quantity of non-nitrogenous agents which they contain, the spirit requiring twelve equivalents of oxygen, and the sugar twenty-four to convert them into carbonic acid and water. A kind of exception is made in favour of gin and whisky, though it is stated that they "most certainly also retard oxygenation," on the plea that, by producing an excess of water in the urine, they keep in solution the excess of urate, which arises from the action of oxygen being by them prevented.

The next means of increasing the action of oxygen is by diminishing the quantity of those substances on which the oxygen acts by means of aperients, and especially by those which produce an increased secretion and evacuation of bile, which, being a highly carbonaceous substance, Liebig supposes is usually reabsorbed, and by uniting with oxygen partly gives rise to the animal heat. It

is remarked that there appears to be an evident connection between the amount of bile removed from the system and that of uric acid in the urine. Thus in serpents, and some birds which appear to throw out a very small quantity of bile, the urine consists almost entirely of urate of ammonia; and in diseases of the liver a large quantity of urate of ammonia is deposited. Liebig believes that purgatives mainly act by removing the carbonaceous substances from the bowels before they can be absorbed, but it is stated that others incline to believe that they merely increase the quantity of carbon secreted, and carry it off. By either explanation the amount of carbon would be diminished, and the oxygen allowed a free action on the uric acid. Calomel, aloes, colchicum, and colocynth, as those acting specially on the biliary secretion, are preferred.

The effects of baths and sudorifics in increasing the action of oxygen is supposed by the author to be attributable to two causes, first to their action on the nerves, and secondly, their action on the blood. The skin is considered as an expansion of the nerves of sensation, and, according to its state, the application of the bath may either have an irritant or sedative influence. The removal of substances from the blood depends both on the temperature of the bath and on the state of the system; and the vapour bath seems to be most efficacious for this purpose. Substances may also be introduced into the blood by means of baths, the absorption through the skin appearing to depend more on the state of the system, and on the substances contained in the bath, than on the temperature. A great part of the benefit derived from bathing in the Teplitz waters appears to depend on the absorption of alkalis by the skin. Medicated baths are directed to be taken before food, when the stomach is empty, as when the system is saturated with moisture, the same amount of absorption cannot be expected to take place. Theory points out the use of two kinds of baths, first, the vapour bath, to remove water and acid substances from the blood, and immediately afterwards an alkaline bath, by which alkaline water may be absorbed into the blood.

The next object is to keep all the uric acid which is formed in the tissues in a state of solution by means of alkalies and water, but the author believes they are the least necessary part of the treatment, and advises only to have recourse to them after other means have failed. Wherever a crystalline deposit of uric acid occurs, alkalies are imperatively called for, to unite with the acid which has caused this deposit to take place.

The author next notices the influence of salt in assisting digestion; the muriatic acid being required to assist digestion, the alkali to hold in solution the albumen, and assist in the formation of bile. It is assumed that salt promotes the action of oxygen on the solid tissues of the body; and it is asserted, though on what

authority is not stated, that no animal which can get much salt can be fattened. It is assumed, that taking much salt with the food produces an alkaline state of the system, by which an excessive action of oxygen takes place on the tissues, and it is to this cause scurvy is attributed. Hence it is stated, that "by diminishing the amount of alkali in the blood, and by giving non-nitrogenous food, the scurvy is cured or prevented;" and that, according to this theory, we are to explain the good effects of lemon-juice, fresh vegetables, treacle, beer, sugar, wine, &c. The lemon juice is thought to act by entering into union with the alkali, being then, by the action of oxygen, converted into carbonic acid, it forms a carbonate with the alkali, when both are in this state thrown out of the system. What would Dr Stevens say to this theory of scurvy? How could alkaline carbonates so speedily cure scurvy, as he showed they did, if that disease depended on an excess of alkali being already in the blood? How could nitrate of potash cure scurvy after even lemon juice itself had been found in certain circumstances inadequate?

Phthisis, another disease in which there is supposed to be an excessive action of oxygen, is casually mentioned merely to endeavour to explain the reason why the blood in it is so very coagulable, while in scurvy it is almost always fluid. It is supposed that the excess of alkali in that disease is carried off by the abundant secretions. Perhaps the author could explain the known beneficial effects of large doses of salt in phthisis, as that disease occurs among monkeys and the lower animals. Its remarkable power in preventing the development of phthisis, to which these animals are subject when in a state of confinement, scarcely seems to accord with the above views.

The sixth chapter is devoted to the Gout, a disease said to be "the invariable result of the uric acid diathesis;" and it is endeavoured to be proved that the causes of and remedies for gout find a ready explanation according to the views of Liebig. It is hence stated, as "most probable, that great weakness and inordinate muscular exertion may increase the amount of metamorphosis in the tissues, and thus give rise to new substances, which must be oxidized in order to be removed, whilst excessive eating, sleeping, and want of exercise, constipation, vegetables, and little secretion by the skin, all produce the same effects, all lessen the amount of oxidation, which is necessary to remove those substances which result from the metamorphosis of the tissues of the body."

A number of authorities are then quoted to show that it is a pretty prevalent belief that gout is excited by want of sufficient exercise and over-feeding. The author, therefore, commends the attention which the homœopathists pay to diet, as more efficacious than medicine in many cases. He also praises the practice of

Priesnitz, at Gräffenberg, in Silesia, as a means well fitted to secure the desired end in gouty cases. The plan pursued by Dr Jephson, at Leamington, consisting at first of abstinence and drastic medicines, then exercise and restricted diet, followed by iron, &c., is shown to accord with Liebig's theory. Many of the German baths and waters, found beneficial in gouty cases, are also commended, and it is endeavoured to be shown they act by promoting the action of oxygen on the system.

The author then enters into the question as to whether the uric acid and the urea are formed in the extreme tissues, or whether some other substance is formed by the first change of the tissues and the uric acid and urea afterwards formed from it at the kidney; and from the circumstance of urea being found in the blood, in Bright's disease of the kidney, and in cholera, thinks it more probable that these substances are formed in the extreme tissues. The acid state of the secretions in some cases of gout has led some physicians to consider acidity as the cause of the disease, but the author thinks it may more properly be ascribed to the want of oxygenation; as to convert lactic acid into carbonic acid and water would require 12 equivalents of oxygen, whilst acetic acid would require 10. As gum, sugar, and starch are liable to be converted in the system into these acids they are recommended to be abstained from as food in those subject to gout.

From this it appears that weakness, excessive sleeping, excessive eating, want of exercise, or the opposite, viz. inordinate muscular exertion, vegetable acids, alcohol, &c., act in the production of gout. In enumerating these the author endeavours to show how each acts. Thus weakness and inordinate exercise tend to the excessive production of uric acid, by disposing to, and causing rapid changes in the tissues. Sleep lessens the quantity of oxygen which can be absorbed, by lessening the number and strength of the respirations, in consequence of which the uric acid which is formed is not changed into urea. By excessive eating the blood becomes loaded with non-nitrogenous principles, and contains an excess of those principles which can only be carried off by the action of the oxygen. Acids render the uric acid less soluble, and therefore, less easily acted on. Wines are injurious from the alcohol they contain, while acid wines are doubly injurious, both the acid and the alcohol adding to the amount of non-nitrogenous principles, for which it is assumed oxygen has a greater affinity than for the nitrogenous substances.

According to this theory the gouty person ought strictly to abstain from all farinaceous articles of diet, and live as much as possible on animal food; and Mr Jones, in opposition to the long known practical disadvantages of this kind of diet to the gouty, and to the very numerous recorded cases in which even hereditary

grout has been entirely removed by strictly abstaining from animal food, recommends it as the most appropriate, and condemns the other as hurtful and having the tendency to keep up the disease.

The seventh chapter treats of the oxalic acid diathesis, and the production of oxalic from uric acid. It is remarked that the circumstance of uric acid calculi being often intermixed with layers of oxalate of lime, has never been satisfactorily explained; but the circumstance of the alternation of layers of these two substances being so common, seems to show that they bear some intimate relation to each other. This, by Liebig's theory, is explained by supposing that the uric acid resulting from the decomposition of the tissues is only partially oxygenized. That if one equivalent of uric acid is decomposed along with four of water and three of oxygen, oxalic acid and urea would alone be formed. This state, then, supposes a further state of oxygenation than when uric acid alone appears, but less than when urea and carbonic acid are produced. The oxalic acid diathesis, therefore, being regarded as a milder variety, as it were, of the uric acid diathesis, the same treatment is recommended for it. The author evidently finds some difficulty in accounting for the constant association of the oxalic acid with lime, and even, contrary to all his theories, allows that "it is highly probable that an excess of lime in the system may induce the formation of oxalic acid." He therefore recommends that distilled water be used as drink, and foods abstained from containing much lime.

The eighth chapter is on the phosphatic diathesis, and on the production of the phosphates of lime and magnesia. The phosphatic diathesis may be divided into the true and the false; the true being that in which, from a general disorder of the system, the urine is secreted alkaline and the phosphates are deposited; the false being that in which alkalescence ensues from an obstruction to the evacuation of the urine or from the diseased vesical muscus changing the nature of the urea.

Phosphorus, phosphoric acid, lime, and magnesia are carried into the circulation of men and of animals, partly by their food, and partly by their drink. The author quotes a short table from Liebig's works, showing the proportions of phosphates which he detected in various articles of diet. It is there stated that when the supply of phosphorus, lime, or magnesia, is no greater than is required in the body for the bones, brain, and membranes, none appears in the urine, the organs of secretion do not separate them from the blood. But when a greater supply is given than is required for use, the excess is thrown out in the excretions, or, in some rare cases, is laid up for future use; as an instance of this last is mentioned these stony concretions called crabs' eyes. It is not explained whence is derived that enormous supply required

by the deer annually for the growth of the new antlers. It is mentioned that grass contains only a trace of phosphate, and on grass the deer lives,—yet it must find in it all the requisites for the supply of that additional amount of phosphates. It is mentioned that, by preventing phosphates from being taken in sufficient quantity, the bones are themselves attacked to supply the deficiency; and the late experiments of Chossat are referred to as examples of this. He fed pigeons on wheat alone, and after some months found their bones diminished in size, shrunk, perforated, &c. It appears very questionable, however, whether his experiments allow this conclusion to be drawn, seeing that wheat contains nearly five times as much phosphates as an equal weight of milk, flesh, or blood, so that the changes could not be alone attributed to a deficiency of phosphates.

A second source of phosphatic salts is said to arise from the oxidation of the phosphorus in the albumen; but it still requires to be proved that the phosphorus exists as such in that substance, it seems to be far more likely that it exists as a phosphate.

The author supposes that the salts of lime when taken into the system are converted into carbonates, and remain dissolved in the free carbonic acid of the blood until they meet with phosphoric acid in the kidneys; but if the phosphoric acid is formed, as he supposes it must be formed, in the blood before it reaches the kidneys, what would prevent the lime uniting with it before it reached the kidneys? Does not the circumstance of all mucous secretions containing phosphate of lime seem to prove that these, both lime and phosphoric acid, circulate together with the blood, and most likely as phosphate of lime? Does not the blood itself furnish phosphate of lime?

The urine in its healthy state being always acid retains the phosphates in solution, but if it becomes alkaline they are deposited. This alkalinity may be produced, the author affirms, either by the taking of alkalies, or by the urea becoming converted into carbonate of ammonia. This change takes place by the urea combining with two equivalents of water, when two of carbonate of ammonia are formed. Urea does not undergo this change when dissolved in pure water, but the author attributes a fermenting power to the mucus. The circumstance of the urine being alkaline in states of great weakness and after injuries of the spinal cord, is endeavoured to be explained on the assumption that sulphuric and phosphoric acids are in such cases only formed from the tissues in exceedingly small quantities, and no longer convert the whole carbonate of lime in a phosphatic salt.

In the treatment of the phosphatic diathesis it is recommended to use such means as shall keep the phosphates in solution, and, as the vegetable acids when given uncombined are found to pass

By the kidney unchanged, they are to be given so to induce such an amount of acidity as shall keep the phosphate in solution, but without causing a precipitation of uric acid. How, it may be asked, could they cause a precipitation of uric acid according to Liebig's theory of the formation of that acid? The amount of phosphates is to be lessened by abstaining from those vegetable substances which contain most phosphate, as bread and potatoes, instead of which peas, beans, and rice are recommended.

Such are the palliative means recommended; as to the general curative means they are summarily dismissed by saying the cause of the alkalinity of the urine must be found out and the restoration of the general health left to the medical attendant.

The second part of Mr Jones's work treats of urinary calculi, of which the first chapter is devoted to the consideration of the nature of the stone. It is remarked that "all similar crystalline particles have a tendency to arrange themselves in similar directions, and to exert a power of cohesion on each other;" and that the mucus of the bladder acts as a kind of cement, and unites those particles which do not otherwise possess the power of cohesion. When a calculus is once formed, if it cause obstruction to the flow of urine, alkalescence is produced and phosphates are precipitated, but in ordinary circumstances urates are deposited on it whenever they exist in the urine beyond a certain amount. The experiments of Berzelius show that the mucus of the bladder acts as a kind of nucleus, in which the urate of ammonia is deposited even when the urine contains no more than it is able to hold in solution. When water was passed into different glasses, that first passed contained all the mucus, and on standing it separated, and on being examined was found to contain small crystals of urate of ammonia, but the whole urate remained dissolved in the other glasses. The same is supposed to happen when a nucleus or calculus is once formed in the bladder. The mucus around it will cause a fresh deposit of urate of ammonia and form another layer. When the stone is free in the bladder the layers may be pretty regular, but if only one side be exposed the additions will take place to that side only. The warty appearance of the oxalate of lime calculus is attributed to the oxalate being an insoluble salt, and, consequently, falling into the bladder in a powdery state. It falls to the bottom of the bladder, mixes with the mucus, forms a mass, and becomes attached to the side of the calculus which happens to be lowermost.

It seems quite unnecessary to notice the characters of the different kinds of calculi as given in the work of Mr Jones. His details, he says, are simply extracted from the work of Berzelius, and the subject has been frequently of late referred to in this Journal.

This chapter concludes by mentioning that the kinds of calculi vary in frequency in different countries. Thus, in England calculi of uric acid are most common, and next to them the fusible calculi, (phosphate of lime with phosphate of ammonia and magnesia.) Thus, of 1000 calculi, 372 consisted of uric acid alone, or mixed with small quantities of urate of ammonia and oxalate, or phosphate of lime; 258 consisted of the fusible calculus (phosphatic earths); 238 of varying layers of uric acid, oxalate of lime, and phosphatic earths; and 142 of oxalate of lime. At Wurtemberg, Raff found among 81 calculi, 22 to consist of oxalate of lime alone; 34 of oxalate of lime mixed with other substances; 7 of uric acid; 9 of uric acid mixed with phosphatic earths; 7 of the fusible calculus; 1 of urate of ammonia; and 1 of phosphatic earth with carbonate of lime.

The author concludes this part of his subject by remarking, that a general statement of the causes of the different kinds of calculi might be given thus: when the health is good and the oxygen acts perfectly, no deposit takes place; when the oxygen acts in a less degree, a deposit of oxalate of lime occurs; when still less oxygen is consumed, uric acid or urate of ammonia is deposited. If the health becomes bad, or the irritation from the stone causes the urine to become alkaline, the phosphates are precipitated; and if the oxygen is still further prevented acting, the phosphoric acid would be found in exceedingly small quantities, and carbonate of lime would be deposited. It might easily be shown, that the above statement is not borne out even by the theory on which it is said to be founded, and that the theory itself altogether fails to explain the occurrence of phosphates in the urine. But the full examination of this point, which we regard as a fallacy, would occupy more space and time than our limits will at present allow.

The means employed for the removal of the urinary calculus form the subject of the author's concluding chapter. In treating of this he passes over all the usual surgical modes of removal, and confines himself singly to the question of the solution of calculi, as attempted *first* by solvents taken as medicines, and *secondly*, by solvents injected into the bladder. Mr Jones gives a very short and rather imperfect account of what has been attempted on the first point, mentioning that borax, alkalies, the carbonated and bicarbonated alkaline waters, (as those of Vichy in France,) and hippuric acid have been administered internally with the view of producing solution of the vesical calculus, but that these have not been attended with that beneficial result which would lead any one to put much faith in them. We expected that Mr Jones would have been able to suggest some new mode of producing solution of these calculi, conform to Liebig's theories of their formation which he

has defended ; but we were mistaken. As to injections, from the already published cases, and a tabular view of them is appended, they seem well worthy of a more persevering trial ; and Berzelius is " perfectly convinced that they have not been often enough repeated to enable us to find out and remedy those obstacles which we are unable to foresee, and which frequently increase the difficulties of their application." A certain portion of success has, however, already been attained,—a circumstance which holds out every inducement to perseverance. According to the nature of the calculus, alkalies, carbonated and bicarbonated alkalies, lime-water, borax, hydrochloric and nitric acid, have at various times been employed. The subject is one which has lately attracted considerable attention in France ; and, in a Report made by MM. Pelouze and Gay Lussac to the Royal Academy of Sciences in March 1842, on the communications of M. Leroy D'Etiolle's relation to the solution of urinary calculi by injections, they were of opinion that the experiments allowed the following conclusions to be made.

1. That certain agents exercise a destructive action on urinary calculi, though they act less on the principles which form them than on the animal matter which unites them. This action is very slow, even out of the bladder.

2. That the cure is not likely to be effected by drinking and baths.

3. Direct injection is more powerful, but success is problematical ; and the chances of inflammation are not sufficiently compensated, as in lithority, by a rapid destruction of the stone.

4. That though the combination of lithority with injection increases the probability of success by increasing the surface, still after the first crushing, the chief difficulties are surmounted, and it will be wisest not to change the mode of cure.

In an appendix is given a translation of Berzelius's account of the state in which uric acid occurs in the urine,—a view which differs somewhat from that of Dr Prout. Berzelius considers it is not generally in the state of urate of ammonia that uric acid occurs ; and, consequently, that it is not held in solution by being in that saline form, but in consequence of some peculiar property of the urine itself. If such were the case it would still further prove the fallacy of Liebig's views, as his theory necessitates that the uric acid should exist as an urate of ammonia, but it would more satisfactorily account for the extreme prevalence of uric acid calculi over those of urate of ammonia. Berzelius also considers that the occasional colours of the urine are not given by purpurate of ammonia, but in consequence of some modification of the ordinary colouring matter.

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v disease which prevails over the continent of America ; and
the body of the work these writers are largely quoted to illus-
the disease of which the author treats.

Dr Bartlett's work is divided into three parts. 1. Typhoid fe-
2. Typhus fever ; and 3. Bilious remittent and yellow fevers.

Typhoid Fever.—Under this title the author includes that
n of fever variously described by the names of entero-mesen-
fever, dothinerterite, follicular enteritis, and typhoid fever,
proves very shortly that the typhoid fever of New England is
same disease, as proved by the similarity of the morbid lesions
evered after death. In describing the symptoms of the dis-
Dr Bartlett goes over each individually, stating minutely all
peculiarities referable to each. In this way, though it is more
ult to pick out the distinguishing general features of the dis-
it is insured that no symptoms shall pass unnoticed.

Typhoid fever either comes on suddenly, or very slowly and
perceptibly, so that the person cannot tell even the day on which
began to complain. An obscure precursory period, characte-
by diminution or loss of appetite, moderate thirst, dry or
y mouth, sensation of soreness or fatigue in the back or
or dull pain in the head, may last from a week even to
weeks. Diarrhoea has occasionally been remarked as the
precursory symptom. Most frequently, perhaps, the inva-
is sudden—out of 112 cases the access in 73 is sudden.
ly sensations or rigors occur in the great majority of cases ;
however, are not in general severe. Following these, or
the intervals between them, increased heat of the skin is
ked ; but at first is neither constant nor general ; the trunk
in some cases preternaturally hot, whilst the extremities are
y, or *vice versa*. In most cases these feverish heats, although
ular in their appearance, observe a kind of periodicity, being
their height in the afternoon. The state of the skin varies in
rent cases, in some being dry, in others covered with moisture.
asionally the perspirations are profuse, and prevent the re-es-
ishment of health. When the sweat stands in large drops
the body, and the cuticle on the palms of the hands and feet
sents a macerated look, the patient rarely if ever recovers. A
uliar odour is exhaled from the patient affected with this fever,
ch Dr Bartlett describes as being of a “ semicadaverous and
ty character,” and so peculiar as to enable the enlightened
itioner whose nasal organs are good to distinguish the disease
this character alone. After recovery the cuticle often peels
from the hands and soles of the feet, the hair also occasionally
off and is succeeded by a new growth.

The pulse is almost always accelerated, and ranges from 70 to
100 in the minute. As a general rule, it was always more frequent
the female than in the male. Dr Jackson, who paid much at-

tention to this subject, found that, in the cases which terminated favourably, the average least frequent pulse was 74, the average most frequent 102 in the minute; whilst, in the cases which terminated fatally, the average lowest pulse was 91, and the average highest pulse 120. A difference, however, existed between the number of pulsations in the males and females. Thus, in the fatal cases among the males, the average lowest pulse was 85, the average highest pulse, 124; whilst, in the fatal cases among the females, the average lowest pulse was 106, and the average highest, 188. Distinct intermissions and irregularity of the pulse occur in a considerable proportion of the fatal cases, which Louis thinks is owing to a secondary affection of the heart.

Cough attends a large majority of cases of fever, attended by a noisy or sibilant rattle and tenacious sputa, either colourless or of a slight rusty colour. Pain in the forehead and temples is common, as also in the back and limbs. In severe cases, delirium is of frequent occurrence, in the fatal cases passing into coma, in the cases which recover gradually abating, and thus constituting one of the surest signs of the approaching subsidence of the disease. In grave and fatal cases, irregular and perverted contractions of the muscles occur, as indicated by *subsultus tendinum*, hiccup, &c. Permanent contraction of the muscles is almost invariably confined to cases which end fatally.

Dr Bartlett considers the symptoms which indicate the state of the digestive organs the most important of all, as it is these which characterize the typhoid fever. The tongue is often natural in appearance, and even in cases which terminate fatally during the second week may be only covered with a thin pale fur, but be as moist as usual. But all appearances may be observed from a thin yellowish fur to the dry, cracked, black, or dark-brown dry tongue. This dryness often extends to the fauces and lips, rendering deglutition and speaking difficult. Aphthæ occasionally occur on the mucous membrane of the tongue and mouth. Nausea, vomiting, and epigastric uneasiness are common. Diarrhœa is a very common and distressing symptom in the grave cases. It occurred in all but three of the fatal cases seen by Louis. In mild cases it is commonly absent. Its average duration in the severe cases was four weeks. The dejections are generally fluid and turbid, with an offensive smell, but containing no mucus. The diarrhœa, however, does not appear to be so common in America as in France. Pain, chiefly confined to the iliac fossa, or to the epigastric or umbilical regions, is frequently the chief source of suffering during the whole course of the disease. Flatulent or tympanitic distension is usually proportioned to the severity of the diarrhœa, and to the gravity of the case. Dr Bartlett regards as one of the most characteristic and diagnostic signs of this fever the gurgling sound

produced by pressing alternately with each hand over the region of the cæcum. As the disease progresses, the urine becomes high-coloured, and when it begins to decline, deposits a copious sediment.

A cutaneous eruption appears to be present in almost every case, probably in every case, if looked for at the right time. This eruption is quite peculiar to typhoid fever, and consists of a small spot, not a pimple, slightly elevated above the surrounding skin, not always sensible to the touch, generally as large as the head of a pin, and of a bright-red or rose colour. The spot disappears under pressure, but returns when the pressure is removed. These spots are generally situate on the trunk of the body, and vary in number from six to a full eruption. These spots generally appear during the second week of the fever, and come out successively one after the other, and after remaining for a week or so, fade away. Transparent vesicles or sudamina are occasionally also seen.

It is stated that tubercular consumption is occasionally developed in strumous habits by this fever; and that a painful stiffness and lameness often exists for many weeks after recovery.

The anatomical lesions which occur in this fever are numerous, several of them peculiar. In about one-half of the cases the heart is found natural in appearance; in other cases it is softened, readily torn, and collapsed. In this case the muscular tissue is pale, occasionally, however, with a violet or livid tinge. Dr Bartlett does not think these changes are dependent on inflammatory action. The internal surface of the aorta is often found red; the redness being either general or in irregular patches; and from the circumstance of this redness being always found in connection with the presence of blood in the aorta, and being proportionately deeper as the heart is more flaccid, it is considered to result from the imbibition of the colouring matter of the blood. The blood itself, in the majority of cases, seems to be deficient in fibrine. When the heart was natural, fibrinous clots were found; when considerably softened in its tissue the clots were non-fibrinous; but when much softened the blood was fluid, and contained air. Blood drawn from the veins during life rarely exhibited the buffy coat; when, however, that coat was present it was soft, gelatinous, and of a grayish or greenish colour. Andral and Gavarret found the proportion of fibrine diminished in proportion to the severity of the disease.

Neither the symptoms nor the lesions tend to show that the lungs play any very important part in typhoid fever. Frequently, however, the lung has undergone a peculiar change. It is of a deep bluish-red colour, has a tough leathery feel, the finger penetrates and breaks it down with difficulty, it is wholly destitute of air, and sinks in water. When cut the surface is immediately

covered with a thick-red fluid. The terms hepatization and carnification have been applied to this state of the lung, a state not indicated by any peculiar symptoms during life. In a few cases marks of inflammatory action are observed in the lungs. The bronchial and laryngeal membranes are occasionally more or less reddened; but the epiglottis is very frequently the seat of ulcerations, extending not only through its investing membrane, but into the fibro-cartilage itself, occasioning, in some cases, extensive destruction of that organ. Effusion of bloody serum is occasionally found in the pleuritic cavity, and probably occurs near the close of life.

The morbid lesions discovered in the brain or its membranes can rarely be traced to have any connection with the symptoms exhibited during life. In many cases no appreciable lesions can be discovered. Thus, of thirty-eight cases reported by Chomel, in fifteen the brain and its membranes were healthy. The most common morbid changes are subarachnoid effusion, injection of the vessels of the *pia mater* and medullary portion of the brain, and a rosy tinge of the cortical substance. Louis found subarachnoid effusion in twenty-eight out of forty-six cases. The effusion is most common in protracted cases; the injection in those which terminate early.

The pharynx and œsophagus are healthy in the great majority of cases; in a few only, ulcerations of the lining membrane are observed. Louis met with eight such instances in forty-six cases. The ulcerations vary in size from one to eight lines in diameter, and are circular or oval, and quite superficial. The lining membrane of the stomach is found diseased in about a third of the cases, the disease consisting in alteration of its colour, consistence, thickness, and in mamelonation, or the existence of ulcerations. These various changes may exist separately, or two or more may be found together. Softening of the mucous coat of the stomach is usually attended with a diminution in its natural thickness, and is most frequently confined to the cardiac extremity. Softening with thinning is almost always found in those who are cut off before the twenty-fifth day of the fever. Ulcerations of the mucous membrane of the stomach are rare; Louis only observed them in four cases, by Chomel they were not noticed in any. They are, in general, small in size, superficial, and not very numerous. The mamelonations consist of small, circular, or oval elevations of the mucous membrane of the stomach, which are scattered thickly over different portions of the stomach. They are most frequently present in those cases which terminate early. It would appear from the cases which have been published, that in all those in which much epigastric uneasiness was accompanied by severe nausea, and repeated evacuations by vomiting of bilious matter, the

mucous membrane of the stomach was found more or less diseased. Several of the above lesions of the gastric mucous membrane have, however, been observed in cases where no symptoms had been noticed during life which could lead to the suspicion of their existence.

In all cases of typhoid fever, says Dr Bartlett, there is lesion of the small intestines; a lesion which is peculiar, which is found in no other disease, and is, of course, pathognomonic of this malady. The duodenum is usually pretty healthy, in a very few cases it has its mucous surface reddened, and presenting a few scattered ulcerations. Where there has been hemorrhagic discharges from the bowels the mucous membrane of the small intestines is found of a red colour, with a peculiar jelly-like appearance. In almost all cases the mucous membrane is of a bright-red colour, but the redness may be seen to consist of separate patches in one place, and of a continuous coloration in others. It is very commonly softened, sometimes so much so as to resemble a layer of pulp spread over the other tissues. Along with the softening there is often increased thickness of the membrane, a change which Louis thinks arises from inflammatory action.

The characteristic lesion in typhoid fever consists in alterations of the elliptical plates or Peyer's glands. When the patient dies early the elliptical plates, together with the subjacent cellular tissue, are found reddened, softened, and increased in thickness, so that they project two or three lines beyond the level of the membrane. The plates are always most altered the nearer they are to the ileo-cæcal valve. The surfaces of the thickened plates frequently present a granular or finely mamelonated appearance, occasioned by an enlargement of the gray orifices of the cryptæ. When the disease has existed somewhat longer before death the plates are found to have undergone a still further alteration; they are then found to be the seat of ulceration. It often happens that, as the intestine is traced downwards toward the ileo-cæcal valve, the plates, from being simply thickened, are noticed with one ulceration on them, and every plate as we approach that valve is found more extensively ulcerated, till they are found entirely destroyed and replaced by ulcerations of the same size. These ulcerations are more or less round or oval, with perpendicular smooth edges. Occasionally their edges are ragged. According to the depth the bottom may be formed of remains of the mucous membrane, of the submucous cellular tissue, of the muscular coat, or of the peritoneal covering. This last covering occasionally gives way, and the contents of the bowels are effused into the peritoneal cavity. The perforation is usually single, takes place at a late period of the disease, and most commonly occurs in very mild or almost latent forms of the fever. Another form of morbid degeneration is

sometimes noticed in these plates. The submucous cellular tissue becomes converted into a substance of a yellowish colour, destitute of any traces of organization, presenting a glossy surface when cut, and as hard and friable as crude tubercular matter. This appearance was chiefly remarked in those cases which terminated early, and must have some necessary connection with the severer and more rapid forms of the disease.

The isolated follicles, or Brunner's glands, are not nearly so generally found diseased; in only twelve of forty-six cases were they met with by Louis in an altered condition. They appear, however, to be liable to the very same changes as the elliptical plates, and, like them, are most diseased the nearer they are situated to the ileo-cæcal valve.

By the examination of patients who have died during convalescence, it has been ascertained that the ulcerations do cicatrize, and, eventually, leave no traces of their existence; and, what is not a little singular, heal over from the ileo-cæcal valve upwards, as was observed in the development of the lesions themselves.

The diseased states of the large intestine consist in distension by flatus, and the presence of ulcerations. The flatulent distension is sometimes so great as to displace the liver and push up the diaphragm. The ulcerations are found present in about one-third of the cases. They are usually small in size as well as in number; and more superficial than those of the small intestines, and more or less confined to the cæcum. In a few instances the isolated follicles are found to have undergone the same yellowish degeneration already spoken of as occurring in the elliptical plates.

The mesenteric glands exhibit various diseased appearances; from simple induration and enlargement to softening and scattered purulent deposits through their structure. The spleen is usually enlarged in volume, and its parenchyma is often reduced to an inorganic pulpy mass; but purulent matter is never met with in it. The liver is softened in about a-half of the fatal cases, but it is not yet satisfactorily ascertained whether this ought to be attributed to changes after death or during life. It was most frequently noticed in warm weather. Occasionally, however, the lining membrane of the gall-bladder was found inflamed, and contained purulent matter.

In concluding this part of his subject, Dr Bartlett remarks, that, in this form of fever, probably the first pathological alteration which takes place in the solids, consist in the tumefaction of the elliptical plate or plates nearest to the ileo-cæcal valve accompanied or followed by softening of the mucous coat, transformation of submucous tissue, and, finally, ulceration; and that contemporaneous with these probably occur the reddening, enlargement, and softening of the mesenteric glands. He is far, how-

ever, from thinking that the fever can be referred to this single local lesion of the intestines; but that it is much more philosophical to consider it as one, but a very important one of the pathological elements, in a very obscure and complex disease. In fact, to hold the same relation to the typhoid fever which the cutaneous eruptions do to scarlet fever, measles, or small-pox.

The ascertained causes of the typhoid fever are referred to age, recent residence in a given place, and contagion. The most prevalent age is from fifteen to forty; and the average age of those who fall victims to it greater than that of those who recover. It has been stated, that the fever is more prevalent among those who have come recently to reside in any place than among old residents. Of 129 cases narrated by Louis, 102 had not resided in the town above twenty months. The same, however, has not been observed in America. As to its contagious nature, many strong facts are quoted to show that it is capable of being so propagated; and a few curious circumstances are mentioned which would lead to the conclusion that it attacks a person but once during the period of his life.

Dr Bartlett considers some of the other circumstances which have been occasionally referred to as causes of this fever, but relative to which it is very doubtful whether they have much influence. These are, locality, season, sex, the action of putrid substances, insufficient or unhealthy food, occupation, exposure to cold, errors of diet, and excesses.

A chapter is devoted to the varieties and forms of typhoid fever, but as these simply depend on the relative severity or predominance of certain symptoms or groups of symptoms, it is unnecessary to enumerate them after the general account given above.

According to the variety of the epidemic, the average duration of the disease varies from twenty to forty days. Thus in the Massachusetts General Hospital from 1824 to 1835, the average duration was found to be twenty-two days; but, in the same hospital from 1833 to 1839, the average duration was thirty-nine days. The same has been noticed in France.

The disease is not marked by distinct stages; nor is often complicated with other diseases. Relapses, however, pretty often occur; an error in diet being very apt to bring on a return of the feverish symptoms. In speaking of the diagnosis, Dr Bartlett remarks, that it can never be founded on a few positive physical signs, as there is no one symptom which may not be absent during its entire progress; and yet, notwithstanding all this, that there are few general diseases the diagnosis of which is so well established, or so certain as that of typhoid fever. In endeavouring to prove his point, however, he is obliged to re-enumerate the whole symptoms

of the disease, and, even then from his own statements, we draw the conclusion, that we can only, with any certainty, diagnose this fever "when observed from its commencement, and followed through its entire course." Diagnosis can be of very little service, then, as the patient will either be recovered or dead. Dr Bartlett, however, after using many arguments, adds, "I do not mean to say by this that typhoid fever can always be distinguished with certainty, from other diseases, even when it is watched during its whole course, and by the best observers." If such be the case, then, Dr Bartlett has failed to prove his point, that this is anything but a simple variety of the continued fever, or typhus of British writers. If such be the case, his work, though intended henceforward to supersede the works of British writers, will but take its rank among them according to its own merits; and the works of the British writers may, after all, prove as serviceable to the American practitioner, and describe as minutely the continued fevers of America, as they confessedly do those of Britain. There is not one symptom mentioned by Dr Bartlett as being peculiar to what he terms the typhoid fever of America, nor one pathological appearance which has not been again and again noticed by the writers of Britain, and after the fullest and most impartial examination of all the author's statements, there seems to be nothing which proves the typhoid fever of America to be at all different from one of the forms of typhus fever which we every now and then witness among ourselves.

As to the prognosis, it is nearly as unsatisfactory as the diagnosis. The very worst cases may recover, and the very mildest may suddenly terminate fatally. The usual symptoms which indicate danger in other fevers mark danger in this. A pulse above 120, chills late in the disease, noisy, irregular respiration, early and violent delirium, coma, *subsultus tendinum*, *facies Hippocratica*, a dry black tongue, tympanitic distension, involuntary discharges from the bowels, and several other symptoms are in general unfavourable phenomena; but many cases recover in which these may have been present.

The mortality is usually great in typhoid fever, varying from one in three to one in six or seven. We know as yet too little of the disease to draw any satisfactory conclusions from the yet published statements of the influence of season or other causes on the mortality. In one epidemic the mortality has been greatest in winter, in another during the summer. Chomel thought it was greatest among those who had come recently to reside in the locality where they caught fever; but this has not been observed in America to influence the mortality.

Dr Bartlett next states his views of the theory of typhoid fever; a subject on which much, but nothing satisfactory, has been writ-

ten. After an examination of the prevalent French doctrines, that typhoid fever is but a consequence of this follicular disease of the bowels, is, in fact, not an essential or idiopathic fever, but an enteritis, or *follicular enteritis*, or a *dothinerteritis*;—he shows that these local lesions are not primary but secondary, and, consequently, instead of being the cause and origin of the disease, constitute only one of its elements, being themselves dependent on some other unknown cause. In the present state of our knowledge it is vain to waste time in useless speculations. We are still too imperfectly acquainted with the numerous facts relative to the disease, to be able, with any prospect of success, to deduce positive conclusions.

Nothing satisfactory is known with regard to the best plan of treating this disease. The most opposite plans have been recommended, and, as yet, no plan seems to possess any superiority over another. In these circumstances, Dr Bartlett, instead of giving a general detail of the various remedies which have been recommended, gives, in succession, accounts of the plans of treatment, followed by Dr Jackson of Boston, Dr Nathan Smith, Chomel, Louis, Bouillaud, De Larroque, &c. These are as different and opposite as treatment can be. Blood-letting recommended by one is condemned by another; purgatives and emetics approved by one are thought hurtful by another, as the bowels are already too loose. In fact, it would almost seem as if the patients would have had a greater chance of recovery if left to nature, than if treated according to any of the plans of treatment yet proposed.

The author concludes this subject of typhoid fever by attempting a definition of it, which, however, extends to no fewer than three pages. In fact, instead of being a definition of the disease, it is an abstract of all its symptoms.

2. *Typhous*.—The second part of Dr Bartlett's work treats of typhous fever; a disease whose history he conceives to be much less complete than that of typhoid fever, in consequence of its being confounded with other diseases. He regards typhous fever as one "more exclusively the prevailing fever in Ireland, and in the northern portions of the British Empire, than in the middle and southern regions of England," and that it is, consequently, a rare disease in France and America.

Typhous fever either attacks suddenly, or comes on gradually. In most cases the persons feel indisposed for some days, complaining of languor, loss of appetite, wandering pains, slight chilly sensations, &c. These increase, till at last the skin becomes hot, often remarkably so, and dry; the heat usually increasing towards evening, so as to cause a thermometer to rise to from 100 to 109° Fahrenheit. A peculiar offensive, somewhat ammoniacal odour is exhaled from the body. The pulse is frequent, generally above

100 beats in the minute, and frequently in severe cases from 120 to 150. The rapidity of the circulation is, in most cases, in proportion with the increase of temperature. In a few very severe cases the pulse has been noted below the natural standard. The pulse almost never exhibits the hard resistant beat of inflammation; and even when full is easily compressed, and after a few days becomes small, soft, and feeble. The action of the heart participates in this character, being feeble throughout the disease. The breathing is frequently affected in typhus fever, and complications with pneumonia or bronchitis are common. Cough, oppression at the precordia, and copious viscid expectoration are, therefore, frequent attendants, especially during the winter months. Headach and pains in the back and limbs are present in almost every case, but usually abate by the tenth day. Confusion of the intellect is an early symptom, and later in the disease dull muttering delirium is usually observed; the delirium occasionally passes into coma; indeed, more or less stupor is usually observed from the time when the disease first fairly forms. The countenance has generally a dull livid-red hue, sometimes approaching to purple; the conjunctiva is injected and dull, and the blood-vessels have a dark-red tinge. The livid hue gradually gives way to an ash or leaden colour, which remain till convalescence is established. Morbid sensibility of the skin, and of the nerves of vision and of hearing are common. The strength is prostrated from the first, and *sub-sultus tendinum* and convulsive twitches of the muscles over the body and face are frequently observed.

The appearance of the tongue is very various in typhous fever. It is, early in the disease, generally covered with a white or yellowish fur, which, as the disease advances, becomes brown and dry till convalescence commences, when the tip and edges become red and moist. Nausea, vomiting, and tympanitic distension of the abdomen are not usually present, and spontaneous diarrhoea or hemorrhage from the bowels hardly ever observed. Epigastric uneasiness and tenderness on pressure are occasionally noticed. In the early stages of the disease the urine is scanty and high coloured. When retention occurs, it forms a dangerous complication. There is not much obvious wasting of the body during the earlier stages of the fever, but it becomes very evident when the fever begins to decline. Hemorrhage from the nose is of pretty frequent occurrence, in the majority of cases on the second day, rarely later than the seventh.

Typhous fever is generally attended with a peculiar and characteristic cutaneous eruption. The disease has hence been occasionally named petechial fever, spotted fever, maculated fever, &c. The spots are of a dun, dusky, purplish hue, in some cases, almost black. They vary in size from a minute pin point to an

eighth of an inch in diameter. They are not elevated above the skin, and disappear only partially on pressure. The spots are often very numerous so as almost to resemble an eruption of measles. When the colour of these spots is florid they disappear on pressure; when dark they still disappear; but when petechial, they do not disappear on pressure. This eruption appears from the second to the thirteenth day, most commonly from the sixth to the eighth, and disappears from the fourteenth to the twentieth day. Gangrenous sloughs are common in some epidemics and rare in others.

The blood, when drawn at an early period of the disease, is dark, and forms a soft dark-coloured coagulum without the buffy coat. At a more advanced stage it presents a dissolved appearance, and when allowed to stand, changes rapidly into a greenish watery fluid with little broken coagula.

Dr Bartlett thinks the anatomical lesions in typhus fever have not been studied with half that care they ought to have been; and, with a prejudice but too common with even scientific American writers, gives a preference to the limited observations of one or two American writers who had only seen one epidemic, to all that host of intelligent British authors who have seen the disease hundreds of times, and examined, with every care, the pathological appearances.

The lungs are generally found to be more or less congested, especially in the most depending portions. These portions are often gorged with blood, and, when cut into, frothy serum escapes with fluid blood. They are occasionally so condensed as not to crepitate when cut, but do not exhibit any granular appearance. Increased effusion was found in the bronchial tubes. The blood found in the heart and great vessels is usually black, thick, and fluid. The heart is, in some cases, softened in its structure and collapsed. The vessels of the brain are often injected with dark blood, and serous effusion found both on its surface and within its ventricles. It is not usually remarked that the effusion of serum has any connection with the delirium or coma; these symptoms being often present when no effusion of serous fluid is remarked after death.

The mucous membrane of the stomach is, in almost every case, more or less softened, particularly in the cardiac extremity or great *cul de sac*. This softening is sometimes confined to a small portion of the mucous membrane, at others it is extended over a large surface. Mamelonation of the mucous membrane towards the pyloric orifice has been occasionally met with. The intestinal canal is in general free from any particular lesions except occasionally ecchymosed spots or patches. The glands of Peyer are in general natural. In a few cases, however, the same lesions are remarked as are met with in typhoid fever. The elliptical plates

have been found in various stages of enlargement; in a few cases even ulcerated, and, in still fewer, the intestine has been found perforated. The spleen is usually enlarged and softened, sometimes is almost diffuent.

In enumerating the causes of the disease, Dr Bartlett considers first the period of life. From his collection of statements, it would appear that the large proportion of cases occurs between the ages of 15 and 30 years, but that we have not yet sufficient data to determine exactly the comparative liability of the different ages of those who are attacked. New residents in any given locality are thought to be somewhat more liable to the disease than old residents, but the published reports seem scarcely to allow this conclusion being drawn. It would appear that season has not much influence on the prevalence of typhous fever, though, from the published statements, it would seem as if the disease were somewhat more prevalent during the summer season. The rate of mortality, however, is highest during spring and winter. Females seem to be somewhat more liable to the disease than males.

Dr Bartlett seems to be of opinion, that typhous fever very rarely occurs in America, the only cases he has seen having occurred in persons newly landed from English vessels, among the passengers or crew of which typhus fever had prevailed. Others, however, have seen more than once that form of continued fever which even Dr Bartlett allows to have been true typhous fever, prevail epidemically in different situations in America. He also seems to believe that true typhus is nearly confined to Ireland and Scotland, and does not occur in countries further south; but if any trust is to be put in medical authorities, true petechial or spotted typhus has been seen in Italy, France, Spain, and many other southern countries. As to its contagious nature, few, we apprehend, at the present day, will be inclined to dispute. How long the contagious principle may remain latent in the system, does not seem to have been clearly ascertained, probably eight or nine days.

Dark, damp, and badly ventilated apartments, anxiety, fatigue, exposure to the inclemencies of the weather, and scanty or improper food, have all been enumerated as causes of typhous fever. It is an undoubted fact, that typhous fever has raged as an epidemic when large masses of people have been subjected to these causes; but it is as notorious that the same causes have often existed, and yet typhous fever has not made its appearance. They may be, and probably are, powerfully co-operating causes, but it would be wrong in the present state of our knowledge to attribute the prevalence of the disease to them alone.

Typhous fever appears to be one of those disorders which a person may take more than once during his lifetime. The numerous recorded cases where this has been observed leave no doubt on the subject; still it appears to be a very prevalent belief, that, if the

eruption has been copious, and the attack severe, the person rarely or never suffers from a second attack.

The duration of the disease varies considerably. Death occurs in some cases even on the fifth and sixth day of the disease. The greatest number of deaths, however, occurs between the seventh and thirteenth day. Authors differ somewhat as to the duration of the fever. Some stating that convalescence usually commences on the thirteenth or fourteenth day and others extending the period to twenty-one days. All agree, however, that the disease runs its course more rapidly before than after puberty. Relapses do not appear to be very common; when they do occur they have been noticed more frequently during winter and variable weather than during summer or steady weather. A crisis has been frequently remarked in typhus fever, in some cases so strongly marked that the exact hour at which convalescence commenced might be noted, in others so imperceptible that it escaped observation. This crisis is usually introduced by a slight rigor, flushing of the face, quick pulse, laborious breathing, heat, tenderness and pain at the pit of the stomach, sometimes even vomiting itself. This state lasts from an hour to the greater part of a day, when the eye becomes clear, the countenance intelligent, the pulse slower and firmer, and all the other symptoms of convalescence are apparent.

The mortality of typhus varies in different epidemics; from one out of every eight to one in twenty. The age, however, of the patient seems to have a marked influence on the mortality; the younger the person the greater the chance of recovery. From some tables which have been published it would appear that the average ratio of deaths in those below twenty years of age is only one in thirty-five; from twenty to forty years of age, the average ratio of deaths is one in twelve; from forty to sixty, one in four; and from sixty to eighty, one in three. Sex does not appear to have much influence on the mortality. Dr Bartlett endeavours to show that it differs from typhoid fever in the mortality being greater among males than among females, but even the very facts which he himself adduces prove the very reverse. When a considerable number of years are taken together it is invariably found that the mortality among the females is far the highest, viz. from one-fourth to one-fifth greater. But special epidemics have, in some instances, cut off a greater number of males, and it is on these solitary exceptions Dr Bartlett founds his arguments. The only true method, however, of arriving at a correct conclusion on statistics is to take the average of a great number of years, and these invariably prove that the ratio of deaths among the females is greater than it is among the males.

As to the prognosis, great prostration of strength, profound

coma, suppression of urine, dark purple or livid petechiæ, as well as a very copious ectaneous eruption, are unfavourable symptoms. A scanty, light-coloured eruption, moist tongue, solvent bowels, and sleep, are favourable signs. It appears to be difficult in almost any case to judge as to the termination of the disease from the state of the animal temperature. Dr Cheyne of Dublin found the mortality lessen as the temperature was higher, that is to say, that the ratio of mortality was much greater among those whose temperature ranged from 98° to 100° Fahr. than in those whose temperature was elevated to 105° or even 109° Fahr.

Dr Bartlett is very full on the diagnosis of typhous fever, especially as to its diagnosis from typhoid fever, from which he considers it a distinct disease,—as “radically dissimilar.” In endeavouring to draw this distinction it is to be remarked that he allows his preconceived theories to sway him in selecting from the works of the writers on continued fever those symptoms only which will contrast with those usually remarked in that variety which he designates by the term of typhoid fever, and considers as a distinct disease. That the two diseases are essentially the same we cannot for a moment doubt, and the very fact mentioned so strongly by Dr Christison, and which we ourselves have frequently had occasion to verify, proves typhus and typhoid fever to be essentially the same disease,—to be but simple varieties of the same general epidemic. Speaking of typhus, Dr Christison says, “The intestinal affection has repeatedly presented itself in groups; the *constitutio dothinenterica*, to speak in nosographical language, has repeatedly appeared and disappeared as a subordinate or intercurrent epidemic, in the course of the more general epidemic typhus.” If other arguments were wanting to prove the fact it would be this, that in almost every epidemic of typhus which appears with any degree of severity a few cases are always met with which on dissection present those morbid lesions regarded as pathognomonic of the entero-mesenteric typhus, and yet during life these patients presented no very marked symptom to distinguish them as labouring under a different disease from the others. Besides, every shade of difference between their more peculiar symptoms and those labouring under a less complicated form of typhus was met with, so that the diseases proved themselves to be but simple varieties of the same epidemic. As Dr Bartlett, however, endeavours, as we have above explained, to show the diseases are essentially distinct, we may shortly notice what he states.

No appreciable difference can be discovered between the two diseases as to their mode of attack, nor in the character of the pulse. The heat is more pungent in typhus. The odour, he says, is different in the two diseases, being æle and cadaverous in typhoid fever, ammoniacal and pungent in typhus. This is not the

case in this country, the stale cadaverous odour being quite as common in the one as in the other, depending probably more on the period of the disease when the patient is first seen than on any other cause. The thoracic symptoms are said to be subject to greater variety in typhus than in typhoid fever, but the character of the respiration is similar in both. The nervous symptoms, the stupor, prostration, &c., are strictly similar in both. But it is in the abdominal symptoms that the chief distinctions occur,—in typhoid fever there is diarrhoea with liquid yellowish stools, in typhus constipation with dark slimy evacuations. Hemorrhage occurs in typhoid fever, rarely in typhus. Abdominal pains are present in both; but in typhoid fever are more frequently confined to the right iliac region, where pressure produces a gurgling sound, not so commonly produced in typhus. Tympanitic distension, which is common in typhoid fever, is rare in typhus. The state of the urine seems to be much the same in both.

The cutaneous eruptions characteristic of typhus and of typhoid fever are unlike in many respects. In typhoid fever the spots are circular or oval, often distinctly though slightly elevated, are of a rose colour, disappear under pressure, and are mostly confined to the chest and abdomen. In typhus they are more irregular in their size and shape, often coalesce, only sometimes disappear on pressure, are often of a dusky colour, and occupy the extremities as well as the trunk. Not unfrequently also they consist of true petechial spots which persist after death.

The anatomical lesions are also somewhat different in the two diseases. The lungs seem to be more frequently the seat of some appreciable lesion in typhus than in typhoid fever. Ulceration of the epiglottis occasionally met with in typhoid fever, rarely or never is remarked in typhus. The state of the heart and of the blood seems to be very nearly the same in both diseases. No appreciable difference appears to exist in the brain in the two fevers. The whole stress of the distinctive characters of the two diseases depends on the anatomical lesions of the intestines. In typhoid fever the elliptical plates of the ileum are more or less constantly altered in structure, being thickened and ulcerated; while in typhus these plates are rarely altered, or only to a very limited extent. In typhoid fever the isolated follicles, both of the small and large intestines, are found to have undergone the same changes found to occur in the aggregated follicles. In typhus they are usually healthy. No diagnostic characters can be drawn from the appearance of the spleen, stomach, liver, &c.

The author endeavours, in addition, to show that typhus occurs more frequently in early life than typhoid fever; that typhus is more circumscribed in its geographical distribution than typhoid fever; that its average duration is less; that it is more amenable to treatment, &c.

The author concludes the subject of the diagnosis of typhus fever by a long and elaborate critical notice of the writings which have been more recently published in Britain, France, and America, on that fever. He then endeavours to show that typhus and typhoid fevers have been by almost all confounded together, and that therefore these writings are useless as guides to the practitioner. He endeavours to establish, what the works themselves in very many instances contradict, that these two fevers are quite distinct, and do not pass by insensible gradations into one another, as is the belief of nearly all practitioners in this country who have seen numerous cases in various epidemics.

Dr Bartlett does not even attempt to give a theory of typhus, finding it a much more difficult subject than even typhoid fever.

The treatment of typhus is very nearly as little understood as that of typhoid fever, and varies much with the nature of the epidemic. In one epidemic moderate blood-letting, purgatives, and saline draughts may suffice to lead a great proportion to a favourable termination. In other epidemics, tonics and stimulants, as wine, camphor, quinine, opium, &c. may be the most appropriate treatment. The character of the epidemic must therefore be studied before recourse be had to one or other plan. If the previous health of the patient be sound, the pulse hard, and the local pain severe, a moderate blood-letting will give relief; but if the health be broken down, if the person is of dissipated habits, has a feeble pulse, is in a state of extreme prostration and torpor, blood-letting will infallibly do mischief. Purgatives in almost all stages of the disease are called for, and advantage has been derived from cold or tepid ablutions, or even from cold affusion. Whenever the cutaneous circulation is languid, the skin not hot, the pulse soft and feeble, and there exists great exhaustion and debility, stimulants and tonics are indicated, and never fail to do good. Emetics given early have often arrested the disease; and antimony has been said to procure sleep and allay nervous restlessness. Camphor or opium have been given with the same view, and often with great advantage.

The subject of typhus fever is concluded with a definition of the disease extending, like that of typhoid fever, to three pages, and being a summary of all the symptoms and pathological appearances noticed in that malady.

The third part of Dr Bartlett's work is devoted to the consideration of the bilious remittent and yellow fevers. In this part he endeavours to prove, what was most satisfactorily established by Dr Craigie in 1837, in his great work entitled "*Elements of the Practice of Physic*," that bilious remittent and yellow fevers are distinct diseases. We are the more induced to make this observation, because many of the remarks on these two diseases, and

especially the fact of the remittent fever often passing into the intermittent, and the intermittent fever assuming the remittent form, &c. are the very arguments used by Dr Craigie so many years before, to prove that these two are somehow connected, but that they differ essentially from the yellow fever. Dr Bartlett also uses Dr Craigie's arguments, derived from the mode in which these two diseases, remittent fever and yellow fever, originate, to prove them distinct. In fact, to one who is acquainted with the writings of Dr Craigie, not only is nothing new stated in Dr Bartlett's work, but the impression is left on the mind that the author has adopted Dr Craigie's views. If, however, Dr Bartlett has never seen the voluminous work of Dr Craigie, the conclusions at which he has arrived confirm the sagacity of that writer, who, without, it is believed, having seen these diseases himself, was able to give the very best account of them which we at present possess in any language.

The author, in describing the symptoms of remittent fever, takes occasion to compare them with those of typhus and typhoid fever; but the remittent or intermittent character of all the symptoms serves at once to distinguish it from these at almost all stages of the complaint. It seems unnecessary, therefore, to do more here than notice the more peculiar symptoms laid down by Dr Bartlett as characteristic of the remittent fever of America.

The chill in remittent fever recurs at regular intervals of twenty-four or forty-eight hours. The heat during the exacerbation is often great, but, during the remission, often falls below the natural standard. The skin becomes sallow or yellowish, but, with the exception of sudamina confined to the neck, no cutaneous eruption is ever remarked. The pulse rises during the exacerbation, but falls to its natural standard during the remission. Cough or other symptoms of thoracic affection are rare. Pain in the head is often severe, but recurs with the exacerbations. The mind is rarely affected, and delirium is rare, only occurring in a few of the fatal cases. Spasmodic twitchings of the muscles are also rare. The tongue is generally moist, covered with a thick whitish or yellowish-white fur. In some prolonged cases it becomes brown and dry. In most cases it begins to clean on the twelfth or thirteenth day of the disease. The bowels are generally costive, and there is a feeling of uneasiness, increased on pressure, extending from one hypochondriac region to the other.

In enumerating the pathological appearances in remittent fever, Dr Bartlett, with a prejudice for which the Americans are unfortunately but too notorious, takes no notice of the observations of any British writer, as if they were incapable of describing what they witnessed, and extracts all his remarks from the limited observations of two American writers. From this it appears that

the organs of the chest, the brain and its appendages, have in general been found healthy, or at least did not present any peculiar morbid lesion. The mucous membrane of the stomach was found changed in colour in various spots. Here and there it presented traces of thickening and mamelonation. The small intestines were found in general healthy. The liver in all cases had undergone a peculiar change of colour. The natural reddish-brown has given place to a mixture of gray and olive. The contents of the gall-bladder were abundant, and more watery than natural, but natural in colour. The spleen was always more or less enlarged and softened, sometimes remarkably so. The mesenteric glands were free from disease.

As to the cause of the disease, it is stated, that "remittent fever is especially a disease of warm climates, and of low, wet, or marshy localities. It rarely, if ever, originates in any of the New England States. It prevails extensively through all the middle and southern portions of this Union, and, in connection with those other two members of this threefold family, intermittent and congestive fever, consisting merely of forms or modifications of the same essential disease, it constitutes the principal fever of these extensive regions." P. 346. Like these diseases, also, induration and enlargement of the liver and spleen are common sequelæ of remittent fever; and it is incidentally mentioned, that remittent fever in general requires much the same treatment as the intermittent fevers. In further illustration of the similarity of these fevers, the common origin from malaria, their frequently passing into one another, the fact of one season being marked by an especial prevalence of the intermittent form, and the next perhaps by the remittent form, the amenability of both to the same kinds of treatment, especially to the administration of cinchona or quinine, are all instanced as so many additional proofs.

Yellow fever is next shortly commented on, chiefly, however, with the view of showing it to be a distinct disease from remittent fever. The initiatory chill comes on suddenly, lasts for about 30 minutes, is rarely repeated, and is immediately followed by high feverish symptoms. The heat is in general very intense, and with a dry skin, but in fatal cases the extremities occasionally become cold two or three days before death. Yellowness of the surface comes on from the fifth to the seventh day of the disease, more rarely by the third day. The pulse is moderately accelerated, not in general rising above 80 or 90 beats in the minute, even in fatal cases. The functions of the lungs seem not to be particularly disturbed. Pain in the head is a very prominent symptom. It is usually severe, and the first symptom which is manifested. Pains in the limbs, and especially in the lumbar region, are also very severe, and compel the patient to toss conti-

nally about his bed. All these often disappear by the end of the first day of the disease. Later in the disease, however, an extreme degree of general uneasiness and anxiety comes on in the severe and fatal cases, but the mind continues clear to the last. There is very rarely either delirium or stupor. The countenance is generally anxious. The senses are rarely impaired, hearing and vision being in general unaltered. The eyes, however, often present a peculiar red, dull, muddy, or glassy and injected appearance, quite peculiar to this disease, it is said,—an appearance which goes off in a few days in the cases which are to recover, but continues in the fatal cases. The prostration of strength is sometimes great; but the general character of the disease is, that the strength continues almost till the agony of dissolution, the patients being able to go from bed to bed, and hold the vessel themselves into which they are vomiting, even to the last hour.

The gastric symptoms are those which more peculiarly characterize this disease. Vomiting is almost invariably present, coming on from the second to the fifth day of the fever. In cases which recovered the vomiting rarely lasted beyond twenty-four hours, but in fatal cases continued till the fatal termination. The matters vomited are yellowish or greenish in mild cases, but become blackish or completely black, constituting the dreaded black vomit in the fatal cases. The matter vomited is either thick like porridge, or fluid, and on standing separates into an upper abundant fluid, of a bistre colour, and an under more consistent mass, resembling coffee-grounds, or small broken clots. Recovery is scarcely ever known after this matter is vomited. Spontaneous diarrhoea is rarely present. In fatal cases the stools often became black at the same time as black matter was vomited. The epigastrium is generally tense and painful. The abdomen, however, is rarely swollen or tender on pressure. Thirst is not a constant symptom. The tongue is generally covered with a moist whitish coat, and its edges are florid. In severe cases it becomes red and glossy, but towards the close of life a dry brown streak appears in the centre, and spreads towards the edges. The state of the urine is not constant. In some epidemics it deposits a lateritious sediment, and is of a deep-red colour; in other cases its physical characters do not appear to be changed. Hæmorrhage from various parts of the body, as from the gums, nose, uterus, &c., is a common symptom late in the disease; the black vomit itself seems to be but a form of hæmorrhage from the mucous membrane of the stomach and bowels.

The morbid lesions in this disease, the author takes on the authority of Louis and Trousseau, from their observation of a single epidemic of yellow fever at Gibraltar in 1828, deeming the other published observations on this subject too imperfect to throw any light on the nature of the disease.

The yellowness remained after death. The muscles had their natural colour, firmness, and cohesion. Flaccidity and softening of the heart occurred in about a third of the cases. The lungs were easily broken down, were covered with black spots, and interspersed with masses of the same colour, these masses being impermeable to air. These masses consisted almost entirely of blood, which could be pressed out when it left the substance of the lung in its natural state. The air passages presented a livid colour. A small quantity of serous effusion was found between the membranes of the brain and in the ventricles. The stomach usually contains a blackish fluid, more or less tinged with red. In every case the gastric mucous membrane was reddened, and either increased or diminished in thickness, and in general softened, in some cases reduced to the consistence of a pulp. Mamelonation was also very generally met with. The mucous membrane of the intestines was slightly injected, or red at intervals, particularly near the termination of the ileum, but rarely altered in thickness or consistence. Peyer's glands were only found once slightly enlarged. The black matter found in the stomach was often found both in the small and also in the large intestines. The consistence of the mucous membrane was diminished in the majority of cases in the large intestines. The liver was invariably the seat of a remarkable change of colour, being in some cases of the colour of straw or butter, or of a yellowish green mustard, or orange colour. It was also paler and drier on its surface than usual. The bile was deficient in quantity, thick, and of a dark-green colour. The spleen was usually unaltered; in a few cases slightly enlarged. The kidneys generally healthy; in a few of a yellowish colour. The state of the blood was not accurately ascertained.

After stating these facts, and comparing them with the symptoms and pathological appearances observed in remittent fever, Dr Bartlett, in order still further to show the difference of the two diseases, alludes to the difference in their causes and their locality. Yellow fever is almost exclusively confined to the cities of warm climates, but is rarely or never seen in the country. It does not originate from marsh miasm, and is nearly unknown in localities where the other is endemic. Besides, those who have had one attack are not liable to a recurrence of the disease for the rest of life.

ART III.—*Medical Order of the Poor-Law Commissioners, dated 12th March 1842, and addressed to the Guardians of the Poor of the several Unions named in the Schedule hereunto annexed; to the Clerk or Clerks to the Justices of*

Commissioners, Status of the Scotch and Irish Surgeons. 4b3
the Petty Sessions held for the division or divisions in which
the parishes and places comprised within the said Unions
are situate ; and to all others whom it may concern.

REFORMS of all sorts move slowly, and Medical Reform is no exception to the universality of the remark. Various are the speculations of professional men as to the causes of this slowness of progression. The indifference of legislators, the arts and influence of interested parties, the tameness and inactivity of those boards which confer medical licenses, the variety of warring interests in the profession itself, and the variety of conflicting views among those who are disinterested, are among the number of the reasons given to account for this phenomenon ; and it is probable that there is some share of truth in all of them. Apathy in the legislator produces impracticability and extreme views on the part of the aggrieved, and these, again, produce hopelessness on the part of those who would willingly co-operate for something practical and practicable. It is thus that those causes act and react on each other, and that the reform so much needed and so greatly desired is postponed by Parliament from session to session ; and as, thirty years ago, men had learned to think that war was the natural and inevitable state of things in Europe, so some medical men appear to regard the present motley condition of their profession, with its conflict of jarring corporate privileges, as the natural and unavoidable state of that profession in our united kingdom.

We trust, however, that the time is now come when the influence of these causes of retardation is diminished, when legislators will be disposed to do their duty, when partial interests must give way to general interests, when the conflict of honest views is likely to end in the support of practical remedies, and when a beam of hope will illuminate those who desire to co-operate for the attainment of a great public good. As one means of lighting up this beam, and promoting this spirit of co-operation, we propose to entertain our readers with the history of a little episode in the general question of medical reform, which, however unimportant in itself, is not without its interest as an exhibition of persevering and successful conflict with some of those difficulties with which our profession has been embarrassed.

The particular difficulties to which we allude arose out of a medical order of the English Poor-Law Commissioners dated the 12th March 1842, and addressed to the guardians of the poor of the several unions throughout England and Wales. By this order, the qualifications of the medical officers were so defined as to include those only who had purely English *medical* qualifications together with purely English *surgical* qualifications as legally

qualified to hold the situations under the patronage of the guardians. There was only one exception to this poor-law proscription of those holding Scotch and Irish professional qualifications. If a board of guardians could not procure a person, in or near the district, possessed of the qualifications above stated, or if the only such person should have been dismissed, or should be incompetent, in such a case, and in such a case only, the guardians might, with the concurrence of the Commissioners, appoint any person, "duly licensed to practise as a medical man," though not possessed of those qualifications which the Commissioners deemed legal under the Act of Parliament.

The promulgation of this medical order immediately produced a strong sensation in the medical schools of Scotland and Ireland and a still stronger sensation among practitioners in England whose qualifications had been derived from the licensing boards in those divisions of the kingdom. Representations of the extreme injury inflicted by that order on Scotch and Irish graduates and licentiates were, in a very short time after its publication, transmitted to the Commissioners, by the Royal College of Surgeons of Edinburgh, by the Senate of the University of Glasgow, by the Senate of the University of Edinburgh, by the Faculty of Physicians and Surgeons of Glasgow, and by the Royal College of Physicians of Edinburgh. There was also a letter addressed to Sir James Graham, Bart. from the Lord Provost of Edinburgh, which was transmitted to the Commissioners by Sir James. From these different documents the Commissioners were fully apprized both of the doubts entertained in this part of the kingdom of the legality of the principles on which their medical order was founded, and also of the very great importance attached by the Scottish universities and boards to those privileges of which their graduates and licentiates had been thus unceremoniously and suddenly deprived.

The Commissioners met on the 12th May 1842, to consider these representations, and explained at large their reasons for adhering to the terms of their order, in a minute which they then published. Their general argument was, that they were fettered by an expression in the 109th Section of their Act of Parliament, which obliged them to choose a "person duly licensed to practise as a medical man," and that the license must, in their judgment, "be derived from some body capable of conferring privileges, and of intervening in restraint of non-qualified persons, in England and Wales." They enumerated the several authorities which, in their judgment, had the power of conferring licenses valid under the Act, which they stated to be, 1. The College of Physicians of London; 2. The Universities of Oxford and Cambridge; 3. The College of Surgeons of London, "having power to confer a license

to practise surgery throughout England and Wales and the rest of his Majesty's dominions, (18 Geo. II. Ch. XV. Sect. 8);" 4. Ordinaries of English and Welsh dioceses, within their dioceses; and 5. The Examiners of the Apothecaries' Company, London. The Commissioners then went on to give several statements with regard to the prohibitory powers of these several authorities; and, among other things, mentioned that the charter of the London College of Surgeons, confirmed by the Act of George II. already referred to, "prohibits every person from practising surgery in England and Wales, unless he be admitted by the College of Surgeons, or be approved by the ordinary, &c., of the diocese, or be a physician." In concluding their minute the Commissioners fully admit the unsatisfactory state of the law, their "frequent experience of the practical inconvenience and injustice which it produces," and their conviction that the "skill and capability" of the possessors of Scotch and Irish degrees and diplomas, "as a class," are "beyond question;" and they defend the obnoxious order solely on the ground that they cannot "assume to repeal what they believe to be the statute law." In the full knowledge in which they then were of the grievous evil and injustice inflicted on many respectable members of the profession, as well as on the interests of the poor, by thus imparting activity to a variety of exclusive privileges, many of which had lost their vitality in consequence of statutory imperfections, we think the Commissioners were bound to be very well assured that they were really acting under the legal compulsion which constituted their sole defence. Had they chosen to assume that the expression "duly licensed to practise as a medical man" was one which justified them in employing persons so licensed, from *every* part of the kingdom, we think it very doubtful if their decision could have been called in question; and we think we see a proof that such was their own conviction, in the very terms of the order itself, which, as we have already mentioned, proclaimed that the Commissioners would, in certain circumstances of exigency, interpret the above expression in favour of the excluded clauses; thus assuming a right to dispense with the law, which, if the law was imperative and unequivocal, was certainly beyond their powers, and which, if the law was doubtful and obsolete, might have been, and ought to have been extended further.

The order of March 1842, and its explanation and defence in the minute of the 12th May following, considered as expositions of the laws regulating the practice of the healing art in England, are open to a greater number of criticisms than we shall think it proper to introduce in this place. It brings out, in all their nakedness and deformity, those anomalies and partialities in the laws affecting the medical profession, by which that profession has suf-

ferred so much, and of which it has so longly vainly complained. It points out the fact, so discreditable to the framers of the English Apothecaries' Act of 1815, that while Scotch and Irish graduates were, by the provisions of that act, jealously excluded from practising as apothecaries in England and Wales, the graduates of Oxford and Cambridge, and the fellows and licentiates of the London College of Physicians were not so excluded; and that even the antiquated privilege possessed by the ordinaries of the English dioceses, of licensing practitioners to act within the limits of their dioceses,—a privilege which may fairly be regarded as a relic of monkish barbarism, and the extinction of which would have been a merit, was preserved entire by the same act which annihilated, as regards England and Wales, whole classes of professional qualifications obtained by British subjects in the most legitimate manner, and highly respected by all who were competent judges of their value. But our more immediate purpose at present is to direct the attention of our readers to the very erroneous explanation given by the Commissioners, of the privileges of the London College of Surgeons, and to the "Remarks" of the Edinburgh College of Surgeons, on the minute containing that explanation.

The commissioners were of opinion, *1st*, That the College of Surgeons of London can confer a license to practise surgery, not merely in England and Wales, but throughout the dominions of her Majesty; and *2dly*, That they possess a power to prohibit persons to practise surgery without their license, within England and Wales. These powers the commissioners believed to be secured to the college by their old charter of Charles I., and by an act of George II., already referred to, confirming that charter. A great part of the remarks of the Royal College of Surgeons of Edinburgh was occupied with an analysis of the grounds on which those rash and ill considered averments rested. We shall endeavour to give our readers a succinct account of this analysis, premising that it was transmitted to the commissioners in a letter dated the 15th December last, and that the letter is most respectful throughout, being a request that the commissioners will give their attention to the argument; "in the hope that they will be convinced by it that they have it in their power, consistently with the present state of the statute law, to direct the guardians to consider a diploma from the Royal College of Surgeons of Edinburgh or Dublin as a sufficient surgical qualification for medical officers for the Unions." It is also worthy of being mentioned, that the College transmitted to the commissioners, along with their remarks, a copy of a paragraph, founded on the "Medical Order," and circulated at that time among the English newspapers, which was directly calculated to advance the interests of the English medical schools and licensing boards at the ex-

pense of those of Scotland, by the assertion that the latter "confer no privileges out of Scotland," and by the further assertion, which proved to be erroneous, that the commissioners had "recently dismissed all those who held Scottish diplomas from their offices under them as unqualified." It was, therefore, under circumstances threatening the total destruction of the Medical School of Edinburgh that the College deemed it necessary to make those representations to the commissioners, of which we shall now quote a part. But to make the argument intelligible, we must first quote the passages of the Minute of 12th May 1842, on which the remarks of the College are founded.

(1.) "As the officer must perform his duties within England and Wales, it appeared to the commissioners that the license must be derived from some body capable of conferring privileges, and of intervening in restraint of unqualified persons in England and Wales."

(2.) "Such authorities are * * * 3. The College of Surgeons, having power to confer a license to practise surgery throughout England and Wales, and the rest of his Majesty's dominions, (18 Geo. II. Ch. XV. Sect. 8.)"

(3.) "In all these cases, the territorial limits of the authority are expressly defined, the license to practise surgery being the only one which extends beyond England and Wales. The prohibitions to practise are equally defined by the territorial jurisdictions of the bodies empowered to confer licenses, except alone the case of the College of Surgeons, who may apparently license a person to practise surgery any where in her Majesty's dominions, whereas the prohibition to practise surgery without the license of the College does not extend to any of her Majesty's dominions out of England and Wales."

(4.) "The charter of Charles I., confirmed by the 18 Geo. II. c. 15, prohibits every person from practising surgery in England and Wales, unless he be admitted by the College of Surgeons, or be approved by the ordinary of the diocese, or be a physician."

Upon these passages the College of Surgeons of Edinburgh remarks as follows.

"In opposition to these statements, it will not be difficult to prove, 1st, that the College of Surgeons in London never possessed a well-established power of prohibiting any person from practising surgery, except within the city of London, and one mile thereof; that the furthest prohibitory jurisdiction they could ever pretend to, extended no further than seven miles round London; and 2d, that, in the position in which the College actually stands, it is more than doubtful whether it possesses any prohibitory jurisdiction whatsoever.

"1st, The following is the statement respecting the College's prohibitory powers made by their champion, Mr Chevalier, in his 'Observations in defence of a Bill,' which the College attempted to carry through Parliament in 1797. 'The Act passed in the thirty-second year of Henry VIII. (A. D. 1541) had inflicted a penalty of five pounds per month on all who practised surgery without their license and authority, within the city of London and one mile thereof;

and the patent of Charles I., given in the year 1629, has extended their jurisdiction to *seven miles round London*; but this article not having been formally inserted in the Act of 18th Geo. II., *great doubts were entertained of the company's power to prosecute offenders*. It was therefore necessary to make this clear; and the increase of population in the vicinity of the metropolis, with the decrease in the value of money, made it seem proper to extend the jurisdiction to *ten miles*, and to increase the penalty to ten pounds, in order to fulfil the purposes originally intended by them.' P. 8. See also p. 6, Art. iv. The bill containing the extended jurisdiction of ten miles, and augmented penalty of ten pounds, in defence of which Mr Chevalier's pamphlet was written, never received the sanction of Parliament.

"As regards the letters-patent of Car. I., erroneously alleged by the Poor-Law Commissioners to have been confirmed by the 18th Geo. II., a slight inspection of them (as published in Paris's and Fonblanque's *Medical Jurisprudence*, Vol. iii. appendix, pp. 36-7), will satisfy any one that the prohibitory clause refers solely to the cities of London and Westminster, or to places within the distance of seven miles of the said city of London; and, as is remarked by Paris and Fonblanque, 'this prohibition under the letters-patent, could have no force till confirmed by Act of Parliament.' What relates to 'other cities, towns, boroughs, and places whatsoever of the kingdom of England,' is simply permissive, *not prohibitory*. How thoroughly Messrs Paris and Fonblanque were satisfied of the total inefficacy of the powers of the College of Surgeons in London to prevent unqualified persons from practising surgery in England and Wales, sufficiently appears from the following statement. 'These are the Acts of Parliament which at present regulate the profession of a surgeon. It is evident that they are imperfect, *as they do not give any power to restrain and punish ignorant pretenders*, who, without the slightest qualification, assume this dangerous and difficult branch of practice, and most especially in the country.' (I. 57.) These quotations appear to establish in the most satisfactory manner that the College of Surgeons in London is not, and never has been, a body capable of intervening in restraint of unqualified persons in England and Wales; far less having privileges entitling it to stand in the way of persons recognized as competent practitioners by competent authorities in the other parts of the United Kingdom.

"2dly, But the Poor Law Commissioners and their legal advisers seem to have altogether lost sight of the fact, that the College of Surgeons in London does not stand in the position which the Corporation of Surgeons occupied previously to 1797. In the year 1800, as stated by Paris and Fonblanque, the surgeons of London obtained a new charter from his late Majesty, which, after reciting the previous charters and Acts of Parliament, proceeds thus. 'And whereas we are informed that the said corporation, &c. hath become, and is now dissolved, &c.' (Ibid. p. 57-8.) Those who have any curiosity as to the circumstances which led to the *dissolution* of the old Corporation of Surgeons, will find them explained in the

first and second pages of the pamphlet above referred to. As the College have themselves admitted the fact, 'we must,' to borrow the language of Paris and Fonblanque, 'take it for granted that the recital is correct. How far the charter of George III., unconfirmed by an Act of Parliament, can revive their ancient rights, may be a most material question.'

This quotation is followed by an abregé of the argument which it contains, and by the following inferences, which appear to us to follow inevitably from that argument.

"1st, That all the bodies in the United Kingdom possessing the power of conferring surgical licenses are quite upon a par as regards prohibitory powers within England and Wales, no such powers being possessed by any of them.

"2d, That it cannot have been the purpose of the Poor Law Act to *confer* any exclusive privilege on the members of the London College of Surgeons, the licensing powers of that body being founded merely on the charter of 1800, and unconfirmed by legislative enactment.

"3d, That the principle upon which the exclusion of the holders of Scotch and Irish diplomas has proceeded *cannot possibly be carried into effect*; and that the Commissioners are, therefore, altogether relieved from the necessity, under which they conceived themselves to be, of giving a preference to any one class of persons having authority to practise surgery 'from a legally constituted body within the United Kingdom,' over any other class or classes 'whose skill and capability are by them admitted to be beyond question.'

The reply of the Commissioners, dated 31st January last, is a singular document. They no longer found their preference of the members of the London College on the ancient charter of that College, and on the act of George II.; they no longer found any part of their argument on the supposed existence of *prohibitory* powers in the London College; they merely state that whatever powers the College does possess "have their application, however great or little that may be, in England and Wales; and that no other authority has any such application within the territory of England and Wales, or can be supposed to be recognized by the English statute unless expressly mentioned." The Commissioners further say that they

"Would not willingly enter upon a discussion of the validity of the powers of the Royal College of Surgeons in London, and it does not appear necessary to do so, for, in the first place, it does not appear to be contested by the writer of the Remarks that the College of Surgeons of London has a licensing power in England and Wales, and, as the power to license is the matter really in question, it would, as it appears to the Commissioners, not at all affect the question, if it could be conclusively shown that the College of Surgeons possessed no power of restraint whatever. Nay, more, if it were fully admitted to

the writer of the Remarks, that the College of Surgeons of London has no powers or legal existence for any purpose whatsoever, it appears to the Commissioners that it would not follow that the Scotch and Irish authorities did possess these powers in England and Wales; it would seem that the sole consequence of such an admission would be that the only persons capable of giving an effectual license to practise in England and Wales would be the Royal College of Physicians, the Universities of Oxford and Cambridge, the Ordinaries of dioceses in England and Wales, and the Court of Examiners of the Apothecaries' Company of London.

"The Commissioners, of course, in considering the whole argument of the writer, do not mean to express a concurrence with his views, or indeed any opinion whatever as to the legal position of the Royal College of Surgeons in London. The expression of such an opinion would, in fact, be entirely beyond the province of the Commissioners, who are bound to assume that the powers ordinarily exercised by that body are usually acquiesced in as belonging to it in England and Wales are good and valid, until some competent court shall have decided to the contrary."

Now, without intending to reproach the Commissioners with any wilful partiality to the English College, we really cannot be so charitable as to think that they were altogether free from unconscious bias, when they penned the paragraphs just cited. Be this as it may, we feel altogether unable to comprehend, without supposing such bias, why a board, which gave proof of so much legal acumen in regard to Scotch and Irish qualifications, should "say that they would not willingly enter upon a discussion of the validity of the powers" of the London College, or express "any opinion whatever" as to its "legal position." Their reasons for taking this course are quite unsatisfactory. The writer of the Remarks undoubtedly did call in question the existence of any licensing powers in England and Wales on the part of the London College, other than those possessed by the Edinburgh College. Beyond a limited district the diploma of the College of Surgeons of Edinburgh is merely a certificate of the fact that the individual has been duly examined by a competent authority; and the London College of Surgeons, whose authority depends on the charter of 1800, unconfirmed by Act of Parliament, does not appear, from Paris and Fonblanque's statement, to possess any powers of "licensing" in any different sense. In the hypothetical case, put by the Commissioners for the sake of argument, that the London College possessed no powers whatever, we think the Commissioners would not have been justified in resting contented with still further narrowing their own selection of medical men by striking off the members of the London College as disqualified, but must, in justice to their own institution, have been compelled at that time (January last) to have applied for a clause in their

new act, extending their powers of choice to all parties whom they thought possessed of the requisite skill ; inasmuch as their medical officers would, in the case supposed, have been without any legal surgical qualification whatever. There can be nothing better for excluded parties than a demonstration of the impossibility of working out those principles of law by means of which they are excluded. It was, therefore, due to the excluded parties to show that the principles by which they were excluded were impartially applied to all. But the Commissioners held themselves bound to assume the validity of the powers exercised by the London College of Surgeons in England and Wales, until some competent court should have decided against them. Why, then, not act thus by the Edinburgh College ? The London College had exercised the powers of examining and of giving diplomas,—so had the Edinburgh. The holders of the London diploma had been received as surgical practitioners in England,—so had the holders of the Edinburgh. Neither of these classes had been set aside by any competent court till our friends the Commissioners performed that office for one of them. The fellowship of the London College of Surgeons was the only one of all the qualifications prescribed in the order (12th March 1842) which the guardians of the unions were to regard as a *sine qua non*, as legally admitting of the substitution of no other qualification whatever, excepting, indeed, in the case already stated, of no person possessed of the London diploma being accessible on the spot. We shall see presently how far this view was consistent with the actual state of the law of England.

We are very far from wishing to denude the Royal College of Surgeons in London of its powers as an examining board ; and we have brought forward this long and laborious argument, not for the purpose of injuring them, but for that of vindicating the claims of our Scottish institutions to being treated with greater impartiality by our friends in the south than we think they have been in this particular instance.

But it is now time that we should come to the last act in this little drama. Petitions were presented to Parliament ; the attention of Scotch members was called to them ; the necessity of a remedy for the exclusiveness of the medical and surgical qualifications of the medical officers of the Poor Law Unions was fully admitted. The Government promised that their intended general measure of medical reform should include these particular grievances. We believe the Government to have been in earnest ; but all was not arranged for Sir James Graham's promised measure. Certain great bodies needed new charters. These were not yet ready ; time was lost ; the session wore on towards a close ; another postponement was added to many prior postponements, and the poor-

law grievance seemed to be shelved also ; but the Home Secretary, urged by the parties aggrieved, and not satisfied with the legal decisions of the Commissioners, directed them to ascertain what the state of the law affecting the Scotch and Irish qualifications really is, by consulting the Attorney-General and Mr Martin on the subject. The following is the opinion of these eminent counsel.

“ We are of opinion, that, as far as the question of *surgery* is concerned, those persons who have a *surgical* diploma or degree from a royal college or university in Scotland or Ireland are (in point of law) as competent to be appointed and to act as medical officers under the statute referred to, as the persons who have the diploma of the Royal College of Surgeons in London.

“ With respect to *pharmacy*, the right to practice (in England and Wales) is confined to those who have the license or certificate of the Apothecaries' Company, and other persons whose rights are saved by the Apothecaries' Acts ; and, in our opinion, persons having Scotch and Irish *medical* degrees are not among such last-named persons.”

This opinion was transmitted to the President of the Royal College of Surgeons of Edinburgh, together with the following letter.

“ SIR,—In consequence of a communication made to them by Her Majesty's Principal Secretary of State for the Home Department, the Poor Law Commissioners have consulted the Attorney-General and another counsel on the competency of medical practitioners possessing Scotch and Irish qualifications to act as officers in a union or parish under the Poor Law Amendment Act.

“ The effect of this opinion (a copy of which is annexed for your information) is as follows.

“ 1. That persons having a surgical diploma or degree from a royal college or university in Scotland or Ireland, are legally as competent to be medical officers under the Poor Law Amendment Act as persons having the diploma of the Royal College of Surgeons in London.

“ 2. That persons having only Scotch and Irish medical qualifications are not as such competent to practise pharmacy in England and Wales.

“ The commissioners think that they are by this opinion justified in admitting persons having a surgical diploma or degree from a royal college or university in Scotland or Ireland to the same rights under the Poor Law Amendment Act as members of the Royal College of Surgeons of London.

“ The commissioners will communicate this decision to the Board of Guardians of all Unions in which any question as to such appointments may have arisen, or be likely to arise ; and will announce their readiness to make such modifications in their general medical order of the 12th April 1842, as may be necessary for giving effect to the above recited opinion of the Attorney-General.”

The last sentence of this letter is not what we should have expected it to be. Under a misapprehension of the law, protested against from the first, but persevered in to the last, the Commissioners had inflicted a grievous wrong on the medical institutions of two divisions of the empire, and on those who had been educated and licensed within the limits of these divisions. They ought, therefore, to have lost not a moment in correcting their erroneous order, instead of "announcing their readiness" to do so; and in sending the corrections to *all* the boards of guardians, instead of sending them to the boards of those unions only "in which any question as to such appointments may have arisen, or be likely to arise." In short, they have given publicity to their change of system in the way least likely to procure them the credit of willingness and readiness to acknowledge their error.

But, after all, this little fragmentary portion of reform leaves us very much where we were before the issuing of the celebrated medical order of the Poor-Law Commissioners. We are still as much as ever in want of a broad, equitable, general measure of reform, free, as regards the profession, from the taint of exclusiveness, and free, as regards the public, from all useless restrictions on the selection of medical advisers. After the lapse of nearly a century and a-half, during which we have been *theoretically* united with England, we are, as regards medical institutions and medical privileges, so little *practically* united, that we may still be held to be, in these respects, a separate nation. These things must be no longer. We must have a medical, as well as a political union. Our legislators must do their duty. They must not only proceed to the good work in good faith, which we will pay them the compliment of presuming to be their purpose, but they must take care that the good work is not thwarted or longer delayed, by unreasonable difficulties interposed by professional men. If the cause of medical reform is not to be deferred till the Greek Calends, the Legislature must be prepared to encounter and to vanquish the selfishness of some sections of the profession, the bigoted prejudices of others, and the stupid indifference and dilatoriness of a third class, whose *vis inertiae* is perhaps a more serious obstacle than either of the former. If, after the very sufficient warning which they have received, any class of medical men be unprepared at the beginning of the next session of Parliament, they must not be suffered to be any longer drags upon the chariot-wheel of this very necessary movement, but must be made to suffer the penalty of their idleness and carelessness, by being left behind while all others are advancing.

The great objects which all professional men of any consideration desire to see effected by the interposition of the Legislature, are, *1st*, A full and sufficient education; *2dly*, A strictly impar-

tial system of examination and qualification ; and *3dly*, The abolition of all exclusive privileges of practice affecting those who are thus educated and qualified. We are happy to observe many indications that we are likely to receive aid and co-operation in the promotion of these great objects, from the most opposite parties in the State. We trust that medical men will see it to be their interest and their duty to discourage the attempts which are sometimes made to poison the discussion of this subject with the spirit of party, and will be ready to do justice to all who are sincerely disposed to befriend them. The cause of medicine is the cause of humanity. It belongs to all parties alike, and it ought to receive, and, we trust, will receive, the friendly services of all of them.

ART. IV.—1. *Manuel Reglementaire a l'usage des Officiers de Santé des Hopitaux Militaires et des Corps de Troupes.* Par J.-A. A.-E. PUEL, D. M., &c. Metz, Paris, Strasbourg, 1857. 8vo. p. 508,

2. *Report of the Commissioners for inquiring into Naval and Military Retirement ; with Appendices. Presented to both Houses of Parliament by Command of Her Majesty.* London, 1840. Folio, p. 370.

3. *Notice sur le service Sanitaire des Armées en Angleterre et en Holland. Extrait d'un travail inedit sur le service de Santé des Armées Europeennes.* Par le Docteur FALLOT, Medecin Principal de l'Hopital et de la Garrison de Namur. Burcelles, 1841. 8vo.

4. *Notice sur l'organisation du service Sanitaire de l'Armée de France.* Par le Docteur FALLOT. 8vo.

ALL the principal nations of Europe have, for a considerable time, had attached to their military establishments and forming a part of those establishments, a body of medical officers highly educated and well informed, and organized according to the best and most approved principles. In some countries, nevertheless, this body is more perfectly organized than in others, and they enjoy a higher and more approved rank as well as more substantial privileges than in others. The nations in which the military medical establishments are most perfectly organized are the English, the French, the German, and the Belgian ; and those in which they appear to be placed on the most liberal footing as to appointments are the English and the French. In these two countries, not only are the medical officers of the army distinguished for their knowledge and experience, but they enjoy a degree of respect and

esteem which cannot be said to be generally accorded to them in other countries of Europe.

This high degree of consideration in which the medical officers of the public service are held, has not been the result of accident, neither has it sprung up suddenly and rapidly. It has been the gradual product of the labours, the exertions, and the services of nearly half-a century at least, and has risen partly out of the improved education which these gentlemen enjoy or have found it requisite to procure, and partly out of the general progress made by medical science, by general knowledge, and it may be said by the improvement of society at large. To the same purpose also the writings of various medical officers of the army have powerfully contributed. At all times the heads or chiefs of the medical department enjoyed a certain, in some instances a high degree of consideration and respect, dependent partly on situation and rank, partly on education and intelligence. Whether this consideration was always merited, or justly bestowed, is a different question. This respect, however, was very much confined to this order of exalted medical officers; and it did not in all cases descend to the regimental surgeons and assistant-surgeons. There was, nevertheless, no good reason why it should not have done so; for a more useful and meritorious class of public servants, it is scarcely possible to imagine, than a body of well-informed and active medical officers.

One great and manifest reason why the body of army surgeons was at one period not very highly estimated, appears to have been the mode in which the army was supplied with medical officers. No means were taken to see that they had a good education such as it was, and such as could then be had; and the result was, that many very unqualified persons appear to have been placed in the army as a convenient refuge for ignorance and inefficiency. Thus we find Mr Guthrie, in his evidence on the present Report, giving the following description, which we believe is pretty generally applicable to the condition of the service in the early and middle period of the reign of George III.

“ The objects of a medical department ought to be attained in the great advantages the sick and wounded may derive from the services of its officers, and the public from the improvement they may make in their profession; but if we look back to former periods, it will be found that these objects were in a great measure overlooked, or made subservient to the wishes and interests of the individuals themselves. Staff-physicians and surgeons were appointed without having served a single day. They were taken from the universities or hospitals to learn their profession at the expense and great inconvenience, in many instances, of the unfortunate soldiers committed to their care. Placed at once, from their appointments in situations of trust, they soon, if they remained in the ser-

vice, claimed and obtained others ; and thus gentlemen who had little knowledge of the habits or the duties of a soldier, of the composition of an army, or of any thing else belonging to it, were to be the advisers of a general commanding in chief, who in the field had rather to teach them their duty than to receive their assistance. Sickness and loss of life, from their inexperience as well as from disease itself, soon rendered an army inefficient, and diminished its numbers more effectually than the enemy. It would be too personal to allude to gentlemen, who, after the lapse of nearly half-a-century, receive large half pay for little duty or service."—Report, p. 195.

The crying and pernicious evil was this, that while now and then an intelligent and well-informed physician or surgeon did get into the army, for it must not be forgotten that Sir John Pringle, Dr Donald Monro, and Dr John Hunter were army physicians, and Mr John Hunter was a surgeon in the army, the great mass of medical officers were imperfectly educated, and men who too often expected to rise by arts and accomplishments totally different from those of a skilful physician or dexterous surgeon, and who actually did rise to offices of great trust and emolument, either in consequence of interest, or by sycophancy, or, in short, by any thing but professional attainments and eminence.

It was quite clear that this was a most effectual method of keeping the medical department of the army in a state of the greatest degradation and contempt. While men saw promotion and rank, and liberal appointments conferred, not according to actual services, not according to the professional knowledge of the parties, not according to the zeal and interest displayed in the performance of their duties to the sick or wounded soldier, but according to the convivial powers, the agreeable manners, and the talent for assentation and parasitical attention of the candidates for preferment, it was not to be wondered at, that no person of merit sought such a service, and that whoever was in it, and had sense and spirit to feel his degradation, would lose no time in quitting it. It would have been to expect a degree of submission and self-denial more than Christian, to imagine that good public servants could be procured under such a system. Accordingly, Mr Guthrie states that it comprehended, in process of time, every species of evil.

" While the army, he says, received little advantages from the services of these officers, the profession at large and the country benefited nothing. They did little or no work, made no improvements, and slighted their harder working brethren who had no interest to aid in their advancement. If the annals of surgery be consulted no records will, I believe, be found of improvements made during the campaigns in the American War, nor in those in Holland, nor in Flanders, nor even at the Helder ; and the contempt of the sur-

geons in civil life was not unfairly bestowed on their negligent military brethren. The fault was not alone theirs, but of the higher authorities, who either denied them due encouragement or bestowed it wantonly and carelessly on individuals who had more or less of private influence."—P. 196.

It might have been thought that this was going a considerable length in the career of maladministration. But as if it required a still more profound degree of stupidity, and a more heinous degree of wickedness to combine their efforts in giving an example of the perfection of all misgovernment, a still more ingenious device was fallen on to degrade and render useless the medical department of the army, by employing persons who, it was not even pretended, knew any thing of medicine or surgery.

"During the Peninsular War," continues Mr Guthrie, "the hardships and sufferings of the medical staff-officers became so great, that the government could not find men qualified to serve in the junior ranks who would go to that army. It would naturally be supposed that the course to be pursued in such emergency would have been to have removed the grievances and defects complained of, or to have increased the rewards. A different plan was, however, adopted; and as competent or commissioned officers could not be found willing to serve, it was thought right to send incompetent men as warrant officers, hired for the occasion, in order to make up in quantity for the deficiency of quality. I have elsewhere pointed out the destruction of human life committed by one of those persons under this authority; and many others did the same, without, however, any real blame attaching to them, for it was known to them that sent them, that they were for the most part ignorant of the profession of physic or surgery."

This sentiment of Mr Guthrie, here expressed, is carrying the doctrine of necessity to as great a length as it could possibly go. He seems here to show lenity and indulgence to the instruments of all this mischief, for the purpose of placing all the blame to the charge of those exalted functionaries, with whom originated the brilliant idea of employing them as efficient physicians and surgeons. Most certainly a heavy responsibility was most shamefully disregarded by the authorities who employed persons so ignorant and so unfit to undertake the charge of the health of their fellow-creatures. But every person of sense and candour must admit that these persons so employed, instruments as they were, were by no means free from blame. Conscious, as they must have been, that they were quite unfit for the duty which they undertook, nay, that in civil society, no person would have, in all probability, entrusted them with the life, even of a brute animal, they, nevertheless, allowed themselves to be appointed to take charge of the health and lives of numerous fellow creatures, yet without the smallest preparation for so difficult and important

a task. Such conduct it is quite impossible to defend, and while a heavy amount of blame belongs to those who placed them in such a position, it is quite impossible to look on the persons employed as quite innocent.

This mass, however, of ignorance and incompetency was, it is known, leavened by a small sprinkling of wisdom and knowledge, which probably prevented the whole from falling into that state of corruption which always awaits bodies composed of such elements.

"There were, however," says Mr Guthrie, "in that army many officers who did their duty well, and who, while their military brethren raised its renown to the highest pitch of reputation and character an army ever attained, formed for it also a surgical reputation; which has not been excelled by that of any nation in Europe. They have left precepts and records which have been since followed and tried on several of the same fields in Spain with the greatest advantage. They have the happiness of knowing that they have been the means of preventing and alleviating much human suffering and misery, of saving great numbers of lives, and of originating one-half of the improvements which took place in surgery during that eventful period. Many of these officers, who have served on full pay nearly ever since that time, have, nevertheless, the misfortune to feel that they alone of the whole army have latterly been overlooked, and considered unworthy of any marks of approbation, and the additional mortification of seeing that this neglect has not been applied to their contemporaries in foreign armies, nor to themselves when employed in civil service, nor to their brethren in civil life." —P. 196.

The truth is, that one of the first things that seems to have done good to the cause of the medical officers of the army, was the strong impression, and the extraordinary effects created in the minds of those most familiar with the scenes in which all this was enacted; by the contrast between efficient and well informed officers, and incompetency and ignorance. Yet, as if more proofs were required to show the gross inability and ignorance of those men who were at the head of the department, numerous errors were committed before the matter was adjusted, and they floundered on in a series of blunders, simply because they would not take the common sense method of insisting on having able and well qualified servants, and holding out adequate and becoming rewards to them, in order to induce them to qualify themselves for a dangerous and laborious service, and to remain in that service. The whole service was still treated in a contemptuous and humiliating manner; the members were considered, with a few exceptions, as persons of no note or likelihood; and all the valuable, elevated, and lucrative offices, usually known by the name of prizes, were lavished indiscriminately on those who had interest, who had friends to support their claims, or who had made themselves useful as po-

litical agents, and tools to persons in power, or connected with those in authority.

In these days, it is a well-known fact that, even to have married the remote relation, or second cousin of some official person, who had a voice potential with the Secretary at War, or even the Under-Secretary, was a much better card than to have married an heiress with L. 80,000, and in no respect to be put in comparison with a service of ten or twelve years in situations of great hardship, and presenting much experience. By such courses knowledge, talent, and real merit were utterly discredited; and, as far as it was possible, the service was rendered unfit for any man with the feelings and education of a gentleman.

We have here adverted chiefly to general evils which tended to injure and damnify, as it were, the service of the medical department of the army; evils, as they may be called, inherent in a great system of mismanagement. Others there were resulting from or connected with them, which were not less injurious. One of these was the system of requiring the medical officers to supply the medicines required for the treatment of the soldiers under their charge. Under this system it often happened that bad, worthless, or inefficient medicines were supplied, and that useful and necessary medicines were withheld, or they were supplied of an inferior quality and adulterated, because to purchase the best and purest medicines entailed a great expense. Here we speak, it must be observed, of facts, and well established facts. We say nothing of motives or reasons, or inducements for this mode of procedure. The fact, we believe, is quite unquestioned and unquestionable, let the motives be what they may. It is a great blessing that all this is now altered, that the medical officers have nothing to do with the supply of medicines, and that for these, in quantity and quality, the apothecary alone is responsible. One advantage not the least, is, that the medical officer may now feel himself elevated above the miserable details of knowing whether the bark is musty or not, and whether the mercurial ointment has received its characteristic colour from the genuine source or from one of a suspected character.

In looking to these evils, and the means of rectifying them, it must be clear as day, that the *first* requisite was to require persons who wished to enter the service to produce evidence of having received as full and perfect an education as the times would admit; and the *second*, that the emoluments and rewards should be upon a scale so liberal that they may not be disposed to regard their position in the army as one of a temporary nature, and which they are ready to change on the first opportunity that offers itself. The reason of the first rule is obvious and self-evident. It is clear that as much knowledge and skill is requisite to take care of the

health of soldiers, and to cure their diseases as those of civilians ; and consequently the best education of the time should be given to the military as well as to the civilian practitioner. The reason for the second condition arises out of the first. It is perfectly reasonable that the scale of remuneration should, upon a general and long average, be quite as liberal to the military as to the civilian practitioner ; not only to induce him to remain in the service, but that it may afford him, at a period when he can no longer hope to be fit for the active duties of his profession, a decent competence in the retirement of old age or infirmity. Many of the advocates of the medical officers of the army have pressed more or less strongly the propriety of giving them honours and distinctions, and also pensions. As to the latter, if the retiring allowance be made liberal enough, or if it be increased according to the nature and length of the services of the individual, any pension becomes unnecessary ; and as to the former, we think the great decoration which most becomes a professional man is that within the service, which is fairly earned by merit and length of duty. The most essential point is, that these officers should be placed not only above necessity, but in a state of comfort, to which young men may look forward as a reward for a life of labour, and in some cases, hardship. It is, nevertheless, not pretended by this to be said that it is absolutely wrong or inexpedient to allow the principle of honours or pensions for distinguished services, as Mr Guthrie recommends. The difficulty is, on the one hand, to decide on the amount of merit or service that should render honours and pensions objects of just desert,—a task which must always be difficult and delicate, and, therefore, invidious and likely to be the source of dissatisfaction ; and, on the other, as the conferring of honours and pensions is of the nature of a luxury, the first and most urgent object is to remunerate properly the services of those who have, by diligent and conscientious discharge of duty, with general judicious conduct, shown that they have contributed to maintain the efficiency, promote the interests, and support the dignity of the service.

We speak thus because we altogether agree with Mr Guthrie in the principle laid down by him, “that promotion in the medical department should take place in a manner similar or nearly similar to that in which it is granted to the army at large by fixed and not by arbitrary rules.” We believe that both honorary distinctions and pensions are granted, not by fixed but by arbitrary rules ; and if the rules are fixed, we know not where to find them ; and we are quite sure, that whatever rules were promulgated for this purpose, would very speedily present a strong tinge of the arbitrary and capricious method, in which it is totally impossible to discover the operation of any rules whatever.

It cannot be denied, that many of the evils deplored by Mr Guthrie have either effected their own cure, or have been rectified under a better system of management. Besides various changes effected in 1810, and more thoroughly in 1830, the inquiry contained in the volume before us has been instrumental in accomplishing other improvements; and we have no doubt that the full benefit of the inquiry has not yet taken place.

The Peninsular war, which rendered so much service to the discipline of our army, and to the improvement of its organization, was certainly also most advantageous in placing the services and situation of the medical officers in a more true light than they had ever heretofore been. It placed in their just position the humble and unobtrusive, but very substantial services of these labourers; and as it was only in situations of great peril, long-continued watching and toil, that their services could be fully and justly estimated, so these situations were most useful in showing how much depended on the duties of the intelligent and judicious medical officer. It was then seen, that, in many instances, regimental surgeons and assistant surgeons were as well informed as those at the head of their department; that their zeal, their conscientious endurance, and their patience amidst difficulties, were the smallest of their qualifications; and that, amidst the distracting labours and tumult of military operations, they could store their minds with new facts, and discover and apply unknown principles; they could rectify erroneous, and simplify old and complex methods of treatment; and throw new lights on the principles and practice of many departments in medicine, surgery, and hygienics.

Colonial service has also contributed much to display, to exercise, and improve the talents and learning of the medical officers of the army; and while happily that has been for many years past the chief scene of their exertions, the comparatively pacific condition which Europe, with the exception of Spain, has enjoyed, has enabled the leading European nations to direct their attention to the state of their respective medical departments, and furnished the means as well as the opportunity of introducing multiplied improvements into the public position and official relations of those meritorious servants of the public.

Our attention has lately been directed to the state of the medical establishments of the army in England, Belgium, and France; and though it may not be quite decorous to bestow all our commendations on our own, yet we must say, that, viewed generally, it possesses to our eyes greater attractions and more solid advantages than any with which we are acquainted. We do not deny that it has defects; and that others also have certain recommendations which do not belong to the English establishment; but, nevertheless, upon taking a full, enlarged, and impartial view, we

think that all unbiassed judges will assign the palm to the establishment of England as at present constituted.

As we have already said, this improved and superior state of the English department is not the work of one day. Twenty-four years of peace have seen various important improvements successively introduced; have witnessed the demands of a more elevating standard of attainment, and more extended professional knowledge; and beheld conferred on the medical officers of the present day advantages and privileges not enjoyed by their predecessors.

The last great amelioration arose out of the report of a committee appointed to inquire into the state of the army, navy, and marines in general, in the beginning of the present reign, viz. in 1838. That commission, consisting of several officers of the first rank, and various noblemen and gentlemen at the head of the departments of the army and navy, made full and thorough inquiry, and at length, in March 1840, presented a comprehensive report, recommending certain changes, the effect of which has doubtless been to improve much the condition of this body of officers.

Till 1830 the medical department of the British army consisted of three orders of officers,—physicians, surgeons, and apothecaries. At that time the rank of physician was abolished and supplied by that of assistant inspector of hospitals, which was also in its turn deemed unnecessary, and therefore abolished by the warrant of October 1840.

By the last warrant, dated 14th October 1840, the rank and commissions of the medical officers of the army were arranged as follow, beginning with the lowest.

1. Assistant Surgeon;
2. Regimental Surgeon and Staff Surgeon of the second class;
3. Staff surgeons of the first class;
4. Deputy-Inspector General of Hospitals;
5. Inspector-General of Hospitals;

All of whom are placed under the Director General of the Medical Department.

These several medical officers enjoy a certain degree of rank and precedence. Thus, the Assistant Surgeon ranks as Lieutenant, the Regimental Surgeon as Captain, the Staff-Surgeon of the first class as Major; the Deputy Inspector of Hospitals, when at the head of the department, as Lieutenant-Colonel; the Inspector of Hospitals as Colonel; and so forth. These degrees of precedence imply, however, no military authority. They are merely assigned as a sort of means for regulating the choice of quarters.

In the number of medical officers on actual service there is nothing fixed. It varies according to the necessities of the service, the creation of a new station, the necessity of increasing one already in existence, the outbreak of a war in one or other of the

remote possessions, and similar circumstances cause that establishment to be extended or contracted. The required officers are taken from the half-pay list.

In England there is no inspector-general of hospitals. At the present time there are three officers of this rank, one in the Windward and Leeward Island command, one in Bengal, and one in Canada. In time of war the number is increased according to circumstances.

Candidates for the Medical Department of the Army apply to the Director-General, who, after ascertaining that they possess the requisite qualifications, recommend their appointment to specific vacancies.

No one can be admitted as a medical officer into the service without possessing the diploma of surgeon from one of the Colleges of London, Dublin, or Edinburgh. This title does not, however, supersede a new examination before a committee of physicians to the army. The applicants must not be younger than 24, nor older than 26 years, and must be unmarried.

Though the examination may embrace all the subjects of the art of healing, it relates especially to the diseases of the tropical regions, and to those to which, in all latitudes, soldiers are particularly exposed, to surgery and military hygiene, and to the regulations of the service.

The officers thus admitted into the service, may be promoted, after serving a certain time, and according to certain conditions, to all the upper ranks; and a mere surgeon has filled the highest rank, even that of director-general.

The assistant surgeons cannot aspire to the rank of regimental surgeon or of staff surgeon of the second class until they have been in active service for five years.

The regimental surgeons, or the staff-surgeons of the second class, cannot be promoted to the rank of staff-surgeon of the first class until they have been in active service for ten years. The latter class cannot attain the rank of deputy-inspector of hospitals until after three years active service at home or two years abroad. And, again, the deputy-inspectors are not qualified for the rank of inspector-general of hospitals until after five years' service in their department at home or three years abroad.

The uniform of the medical officers is the same as that of the military officers in the same corps. They wear all the military decorations of the rank to which they are attached.

The pay varies, for the same rank, according to the duration of the service. That of the director-general alone is fixed by the Treasury, because the office is said to be a civil appointment. This progressive increase of pay is a measure of great equity, the only one by which it is possible to compensate the slowness of promotion and the impossibility of rising to the highest ranks in

the army. The following table presents the rates of pay regulated upon the principles now specified.

Ranks.	Rates of Daily Pay subject to the above Provisions			
	After 25 years' actual Service.	After 20, but under 25 yrs.' actual Service.	After 10, but under 20 yrs.' actual Service.	Under 10 years' actual Service.
Assistant Surgeon, .	L.0 10 0	L.0 10 0	L.0 10 0	L.0 7 6
Regimental Surgeon and } Staff Surgeon, 2d Class, }	1 2 0	0 19 0	0 15 0	0 13 0
Staff Surgeon, 1st Class.	1 4 0	1 2 0	0 19 0	...
Dep. Inspect. Gen. of Hos.	1 10 0	1 8 0	1 4 0	...
Inspect. Gen. of Hospitals.	2 0 0	1 18 0	1 16 0	...

Besides this ordinary and current rate of pay, however, additional allowances are made to the officers at the head of departments when serving on foreign stations under the following circumstances, viz.

If with an army in the field of 10,000 men or upwards, } 20s. per day.
 Do. 5000 do. 15s. "
 Do. any less number, 10s. "
 If serving in a colony where the forces consist of } 5s. "
 1500 men or upwards, ...

Each regimental medical officer is usually allowed by the commanding officer to have a private who acts as his servant. Regimental surgeons being obliged to keep a horse are allowed a ration of forage from the public.

While the financial position of the medical officers of the English army on actual service is so favourable, their prospect on retiring from service by reason of age or infirmity is not less so. A medical officer placed on half-pay in consequence of reduction of the establishment receives pay at the following rates.

Ranks.	30 years' per diem.	25, but under 30 per diem.	20, but under 25 per diem.	10, but under 20 per diem.	Less than 10 per diem.
	L. s. d.	L. s. d.	L. s. d.	L. s. d.	L. s. d.
Inspect. Gen. of Hospitals,	1 10 0	1 5 0	1 0 0	...	...
Dep. Inspect. Gen. of Hosp.	1 0 0	0 17 0	0 14 0	0 10 6	0 8 0
Assistant Inspect. of Hosps.	0 17 0	0 15 0	0 12 0	0 10 0	0 7 6
Staff Surgeon,	0 16 0	0 14 0	0 12 0	0 9 6	0 7 0
Regimental Surgeon, .	0 15 0	0 13 0	0 11 0	0 8 6	0 6 0
Assistant Surgeon, .	0 7 6	0 7 0	0 6 0	0 5 0	0 4 0

When a medical officer is placed on half-pay from any other cause than reduction of the establishment, the pay is regulated by the following table.

Ranks.	30 years per diem.	25, but under 30 per diem.	20, but under 25 years.	10, but under 20 years.	Less than 10 years.
	L. s. d.	L. s. d.	L. s. d.	L. s. d.	
Inspector Gen. of Hospitals,	1 0 0	0 15 0	0 12 0	..	...
Dep. Inspect. Gen. of Hosps.,	0 18 0	0 14 0	0 10 0	0 8 0	0 7 0
Assistant Inspect. of Hosps.,	...	...	...	...	...
Staff Surgeon,	0 16 0	0 13 0	0 9 6	0 7 6	0 6 6
Regimental Surgeon and Staff Surgeon, 2d Class, }	0 15 0	0 11 6	0 8 0	0 6 0	0 5 6
Assistant Surgeon,	0 7 0	0 6 0	0 5 0	0 4 0	0 3 0

Every officer who shall have served actively for twenty-five years and more, has the right of retiring with half-pay, and may be proposed for the enjoyment of that specified in table I., provided he shall have served three years in the rank which he held at the period of retiring. In the contrary case he will receive only that of the rank from where he was last promoted.

A medical officer, who has served actively for thirty years, including three in the rank in which he retired, or who, instead of the three years in the retiring rank, has served ten years in the colonies, or has made five campaigns in any rank, may enjoy half pay conformably to the table No. I. It must be understood that this class would not be applicable to him who retires immediately after being promoted.

In the foregoing system of arrangement there is only one measure, the prudence and propriety of which may seem doubtful. This is the expulsion of physicians from the list of army medical officers. We are aware, as has been above stated, that the appointment to this office, and the office itself, was the source of constant dissatisfaction, and that we do not deny. It appears, nevertheless, that this arose out of the mode in which physicians were appointed, and was not necessarily connected with the office. It must be admitted, that when a young, and possibly inexperienced person, was appointed physician to the forces, merely because he was a graduate of a university, it was not in the nature of things that such a mode of procedure could operate satisfactorily. It appears, however, that in practice it has been found inconvenient; and hence, in place of physicians, properly so called, staff-surgeons have been substituted.

On this subject it is right to hear Mr Guthrie, not because he is quite reasonable in this matter, but because as a surgeon, he may be expected to glorify surgery, and treat medicine and physicians with small respect. Let us listen then to the words of the wise; for they are precious.

“ The assistant-inspector of hospitals has taken the place of physician. The office of physician has merged in that of assistant-inspector. (The latter office has also been discarded.) When the army went into the field in former days, it was supposed that it

ought to have a surgeon who knew little or nothing of physic, and a physician who knew nothing of surgery ; but of late years the education of all medical officers has been made the same, and therefore, when the chief of a staff goes on service, he may say, I have three staff surgeons who are addicted to physic, and three who have an inclination for surgery ; therefore, to the hospital that contains only sick I shall send the staff surgeon, who is addicted to physic, and to the other hospital, which contains wounded, the staff surgeon who likes the practice of surgery ; but as a battle is an occasional thing and sickness is always present, they should be equal or nearly equal on every point. The office of physician was formerly more useful in enabling the physician general at home to provide for particular people, than for their utility on service before the enemy ; for they were taken from the universities or from private life without ever having seen a soldier except on parade ; and as the physician had precedence, as in private life, where, in consultation, he always signs first, he had the same precedence in the army ; and when a promotion took place, he became a deputy-inspector, and if another promotion took place he became inspector-general ; and thus, although probably a less efficient officer than the staff-surgeon, he became much the senior, and had charge of an army of which he knew nothing. Sir Henry Hardinge abolished this office, but instituted that of assistant-inspector in its place. I wish to abolish the title of assistant-inspector, and call the gentlemen by their right names of staff-surgeons, or staff-physicians and staff-surgeons if you please, giving them equal rank and precedence according to their standing. I will not even ask a shilling a day extra, if that is a serious difficulty in the way of this arrangement to which I attach so much importance."—Pp. 199, 2694.

Now there is in this proposition some good and some evil. It must be allowed, and it is fortunate that it is so, that physicians and surgeons receive the same education nearly, though that is one of those beautiful abstract truths that cannot be said to be realized in all the London schools ; and the result is, that the physician must know something of surgery, and the surgeon cannot be ignorant of medicine. It happens, however, that the knowledge of surgery possessed by the physician, and the knowledge of medicine possessed by the surgeon, depend in actual practice, very much upon the school at which these functionaries have been educated, and the manner in which their education has been conducted. We have been unfortunate enough to see physicians who knew just about as little of surgery as it was possible to know, who could not distinguish between peritonitis or enteritis and strangulated hernia ; and we have seen surgeons, who, whatever might be their addiction, as Mr Guthrie calls it, knew absolutely nothing of the means of distinguishing the presence and extent of internal diseases, and were consequently often at fault in treatment.

The best answer, however, to this question is, that in the English army, as at present constituted, all the surgeons and staff-sur-

geons are, properly speaking, medical officers or general practitioners. For surgery, properly so called, there is in the time of peace little or no demand. For a competent knowledge of medicine, the diagnosis, prevention, and treatment of diseases, the demand is constant and incessant. The regimental-surgeon, indeed, is more a physician than a surgeon, and he has, further, the whole financial charge of the hospital department.

In Belgium, we are informed, that a new method of organization has recently improved remarkably the position of the medical officers of the Belgian army, both in a moral and medical point of view.

The body of medical officers of the Belgian government constitutes a separate corps, quite distinct from the others and from the administration. An officer, endowed with the rank of inspector-general, and rated with majors-general, is head and representative of the department immediately next to the Minister of War-department. He alone makes all the propositions for admission into the service, change, preferment, and retirement. To his board are referred all the officers relating to the service, to pass them directly into the hands of the minister. In his possession are deposited the matriculated registers, &c. He advises the minister as to all objects relating to the sanitary service of the army.

The body is composed of medical officers, of apothecaries, and of veterinary surgeons.

It is recruited, so far as relates to the first class, from among the pupils of the school of military medicine established at Utrecht. The following table shows the number of officers, their qualifications and mutual relation, their full pay, and the indemnities which some of them enjoy, the whole calculated on the scale of the peace establishment.

Title and Rank.		Corresponding Rank in Combatant Officers.	No.	Pay.			Supplement.			Total.		
				L.	s.	d.	L.	s.	d.	L.	s.	d.
Inspector-General, Inspector,		Major-General,	1	405	15	0	84	16	8	471	1	8
		Colonel,	1	352	14	2				352	14	0
First Medical Officer.	1st class,	Lieutenant-Colonel,	2	264	11	8				592	3	4
	2d class,	Major,	4	229	5	0				917	0	0
Medical Officer.			6	211	12	6						
	1st class,	Captain,	6	176	6	8						
	2d class,	Lieutenant,	60	132	5	0						
	3d class,	Sub-lieutenant,	60	88	3	4						
Apothecaries.			60	70	10	10						
	1st class,	Captain,	1	141	0	10						
	2d class,	Lieutenant,	13	84	6	8	52	17	6			
Veterinaries, Assistant-Veter.	3d class,	Sub-lieutenant,	13	52	18	4						
		Lieutenant,	9	88	3	4						
Pupils,		Sub-lieutenant,	9	61	14	2						
	1st class,		6	26	9	2						
	2d class,		16	17	12	6						
			213									

* A supplement of L. 2645, 16s. 8d. allowed to two apothecaries of the second class attached to the central apothecary board.

The supplement is paid by the department of Marine and Colonies.

The division of the medical officers of the first class into three orders, distinguished by the improvement in their treatment, M. Fallot regards as unfortunate.

Looking at the arrangement superficially, a different judgment might be formed ; and as the promotion to this rank is regulated exclusively by length of service, it might appear perfectly just to ameliorate the lot of those longest in the service. When, however, we examine further the measure, and consider its effects, we find that it is deficient in equitableness. From the moment, indeed, that the two first orders are and remain complete, the medical officers of the third order, whatever be the duration of their service, are reduced indefinitely to the congruous portion. He prefers much, he says, the mode of proceeding adopted in England, where the pay of the medical officer increases without distinction, in all those of the same ranks, counting the same number of years of service.

Admitting, though a supposition quite gratuitous, that one day may arrive on which all the officers attain the maximum of pay, it would not cause a great charge to the exchequer, and the interests of justice would be satisfied. But if, in justification of the plan now censured, it were alleged that it is only the application to the medical department of the principle adopted as to captains of the army, it may be answered that it is exactly this application of the same principle to objects essentially different that is reprehensible. The prospect of captains is indeed in some sense unlimited ; to them all the ranks above them are accessible ; the prospect of the medical officers is extremely limited. To the first order the ascending movement, or that of promotion, however slow it may appear, is very rapid compared with that of which the medical department is susceptible, and it is evident that, in ordinary periods, the possession of the rank of medical officer of the 1st class of the 3d category will be what may be termed their marshall's staff.

The half-pay of these officers is the same as that assigned to the ranks to which they are assimilated.

This new arrangement is chargeable, according to M. Fallot, with another defect, in not paying any regard, in half-pay, to the differences of full pay among the three categories of medical officers of the first class. The advantages granted to lengthened service ought not to cease, he observes, at the time when they would be most precious ; and here also he takes occasion to remark, that the organization in England is infinitely superior, and, above all, worthy of serving as a model. In some states of Germany, especially Bavaria, the medical officers enjoy, at the end of a certain

number of years, the whole of their full service allowances under the head of retirement ; and when it is remembered how limited the career of medical officers is everywhere, how slow the promotion, how moderate their appointments, how unstable their existence, and that they have not within their reach any source of fortune, or any access by solicitation of power to the situations reserved for aged officers, and constituting honourable retreats,—it may be inferred, he thinks, that the state which they have served with honour, loyalty, and disinterestedness confers not too much on them, by securing for them a suitable provision when age or infirmities shall have rendered them incapable of continuing their services.

We have already adverted, in speaking of the English establishment, to the propriety and necessity of placing the medical officers, at the period of retirement, in a situation of competency if not independence. For this various reasons may be assigned ; but the most satisfactory and conclusive is, that it cannot be expected that a professional man, who has spent the best part of his days in the toils and hardship of military life, should still find it necessary for his subsistence to labour as a civil practitioner. At that period of life, it may be observed, at which he quits the service, he cannot with propriety act as a young candidate for civil employment. His health may be impaired, or at least irregular. His mental energy is very likely to be impaired. Notwithstanding these manifest reasons, it is commonly supposed that a medical practitioner retiring from the army has a good chance of employment among civilians. Instances, no doubt, occur in which they do obtain employment, sometimes to great extent, and lucrative. But almost all testimony shows that this is the exception and not the rule. Indeed, in order to succeed as a civil practitioner, it appears that a man must have quitted the army early, while his body and mind are still active and energetic. It appears that this point, which attracted the attention of Mr Guthrie, has been greatly discussed in Belgium, and we have here the observations first of Mr Guthrie and then of M. Fallot on it.

“ When gentlemen have served 30 years,” says Mr Guthrie, “ a great change has taken place in their professional prospects. I have recommended that a shilling a-day should be taken away from the assistant-surgeons of 14 years’ standing, because they can get their bread by their profession ; but a man, after 30 years, can rarely do so, and that is the reason why it is better to let surgeons go at 25 years, than at 30. A man at 25 years may possibly get his bread by his profession ; but I am quite sure a man of 30 years’ standing, and between 50 and 60 years of age, can very seldom do it, and there are scarcely any instances to the contrary. Take all the officers that have served 30 years, and have been placed upon the retired list, and enquire whether any of them have got into prac-

tice in private life, and I will venture to say that nine out of ten of them do not make one shilling by their profession. I know there is an opinion entertained that the old surgeons of the army can go and sit down in many places, and that the public will be delighted to employ them; but the truth is, the public will do no such thing, for an army surgeon of between 50 and 60 years old cannot become an apothecary; he will not attend to '*les affaires particulières des dames*' at all; it is not his habit, and without being an accoucheur he has no chance of doing any thing in any country town in Great Britain. As a surgeon only I am afraid he has not the slightest chance of getting a livelihood anywhere. As a physician he may get some practice; but the instances are so rare of success, that with the exception of Dr Ferguson, at Windsor, one of the ablest and most distinguished physicians in the service, I do not know a single person I can immediately recollect of that standing who makes a decent income by his profession. The consequence is, that they very generally retire, finding their profession of little use to them, and live, like other half-pay officers, in the best way they can." Pp. 197, 198.

"There exists," says Mr Fallot, "an absurd prejudice, which is so general and inveterate that, though I attack it with the fullest conviction I am far from flattering myself, that I am able to destroy it. This is that it is less necessary to provide for old medical officers than their associates, the combatant officers, as they are denominated, because, on quitting the service, they find one ready made for them in the line of their profession. Hearing this fact stated with so much confidence, it might be thought that it has been sanctioned by long experience; and yet I believe that any one would be puzzled to cite one single example. If any exist in our country I declare solemnly that I know them not. And would any one wish that it should be otherwise. Is it not known how narrow is the path which leads from the temple of Epidaurus to that of fortune? What a crowd of young vigorous competitors, with prepossessing address, impelled often more by the spur of necessity than the desire of distinction, pressing, jostling, and oversetting each other. And how few notwithstanding their efforts attain their object? And in the midst of this passionate struggle, what is to become of a poor old man bowed under the weight of years, ignorant of the means of attracting the public, and imperfectly acquainted with the language used by them? If fashion followed everywhere talent, I think it would not always foil the veteran army medical officer; but to attain success something else is required which, I will not affront the understanding of my readers by specifying, and which rarely makes part of their stock in trade. But, admitting that fashion could come to their aid, and they in a state to satisfy its demands; our army admits as physicians none but graduates. It is requisite to fix after this the medium age of entrants at 24 years at least. Forty years of service are required to constitute a right to retire, of which four years are remitted for the period of study. At the age of 60 years, then, the military physician is restored to civil life, and enters on a

new career, which, if void of the fatigues of that which he has quit-
ted, has other daily labours not less trying. A person who has
reached this age, amidst laborious exertion, requires repose which
cannot be found in commencing civil practice beset with so many
thorns, and abounding in so many anxieties, intrigues, and rivalries."

This picture contains no encouraging view, and paints the pro-
spect in darker and more gloomy colours than it really presents
in this country. The truth is, that, though it requires a man to
quit the army early if he wishes to succeed as a civil practitioner,
there are and have been instances in most of our large towns where
practitioners from the army and the navy have succeeded in get-
ting a very respectable share of lucrative civil practice. Assur-
edly much here depends on what we blindly and ignorantly call
accident and opportunity; but still occasionally the thing does
take place. Abroad, and especially in Belgium, there seem fewer
chances for success of this kind.

We return after this digression to the immediate subject of dis-
cussion.

Seniority only regulates promotion to the rank of medical offi-
cer of the first class exclusively. Beyond that it is choice. Se-
niority, however, constitutes a right only to those who have un-
dergone satisfactorily the examinations prescribed for the rank to
which they aspire.

The widows enjoy the pension of the rank to which that of
the deceased husband was rated.

By compensating for the advantages belonging to medical offi-
cers by the new organization, civil practice is forbidden them un-
less in consultation.

The object of this arrangement is doubtless rational. It deter-
mines that the military physician should devote himself altogether
to the service, and shall not employ in any other way the mo-
ments to be consecrated to that. M. Fallot thinks the means
chosen to attain the object not equitable and at the same time il-
lusory. Their want of equity, he thinks, consists in this, that the
measure affects not only those who, entering the service in future,
will have preceded the conditions at which they are admitted into
it, but also those already in the service, without leaving the latter
the choice between the past and the future state of affairs. There
was further between Government and them a synallagmatic con-
tract, stipulating reciprocal obligations, and which in justice ought
not to be changed without the consent of both parties. The measure
was further illusory, 1st, because it could not extend to those
whose connection was already formed, and because, to reconcile
fact with right, it would be necessary, as in 1837, when this ar-
rangement was first made in the regulations, to grant dispensa-
tions; 2d, because it can easily be evaded by uniting with one or

two professional brethren ; for what is a consultation in Holland but the meeting at a patient's residence of two or more physicians. In short, he remarks it resembles spider-webs which catch small flies but let large ones escape.

The regulation seems something like over-legislation. All penal laws or regulations of any kind against men applying their knowledge or skill in any way beneficial to their fellow-creatures are injurious ; and the enforcement of such laws savours so strongly of the inquisitorial power, that they ought to prevail in no free country. If a medical officer of the army can benefit any one by his advice, it seems absurd and cruel to prevent him from doing so. If in doing so he neglects his own duty, if duty he has to perform, that is another question, and ought to make him amenable to his superiors, who ought either to reprimand him, if he is really negligent, or supersede him if he persists. But it seems most inquisitorial legislation to give any board authority over any medical man who satisfies the demands of his official situation, to prevent him from employing his time, his talents, or his knowledge, in any way most useful to himself or the public.

Here, also, M. Fallot tells us, that he approves most of the English institutions, which, if not more liberal, are, at least, more rational and practicable, and in proof he quotes the twenty-eighth article of the general instructions for the administration of general hospitals.

“ No officer nor servant attached to the establishment shall be capable of fulfilling other functions than those intrusted to him, and the accomplishment of which is considered sufficient to occupy him entirely. This prohibition, nevertheless, is not intended to prevent physicians and surgeons from giving accidentally their professional attentions to persons living in the neighbourhood of the hospital, who may apply for these attentions. But it ought to be well understood that this permission to practice among the civil inhabitants ought to cause no detriment to the service.”

Here, he remarks, all is safe, and every thing reconciled ; the rights and dignity of the physician, and the duties and interests of his office. His conscience is left to decide to what extent he may make is practice, and his duty precede ; and every one knows that an appeal of this kind has more weight with a man of honour than an injunction or a prohibitory order.

We come next to the French system of organization of the Medical Department of the Army. The present position of this body is determined, by a royal ordinance, dated the 12th of August 1836. This ordinance is divided into ten heads or chapters, named titles, and preceded by a report made to the king by the minister of war.

The first title gives the composition of the body of medical officers of the land army and of the hierarchy.

1. The medical officers of the land force are composed of three distinct divisions ; physicians, surgeons, and apothecaries.

2. The hierarchy for each of the divisions of the body of medical officers of the land force, and the correspondence of ranks are regulated in the following manner :

Physicians.	Surgeons.	Apothecaries.
	Subassistant.	
Assistant.	Assistant-Major.	Assistant-Major.
Ordinary.	Major.	Major.
Principal.	Principal.	Principal.
Inspector.	Inspector.	Inspector.

The body of medical officers is recruited from the pupils in surgery.

3. The Constituent Establishment of medical officers is fixed in peace at the following number.

Physicians.	{	Inspectors, . . . 2	Surgeons.	{	Inspectors, . . . 2	Apotheca.	{	Inspectors, . . . 1
		Principals, . . . 8			Principals, . . . 12			Principals, . . . 8
		Ordinaries, . . . 53			Majors, . . . 223			Majors, . . . 27
		Assistants, . . . 24			Asst.-Majors, . . . 374			Asst.-Majors, . . . 59
					Subassistanta. . . 410			

4. In time of war, and during inadequacy of the constituent establishment rated for peace, the surgical pupils of acknowledged capacity may be provided with the employment of assistant-surgeon, without waiting until they have satisfied the different competitions required by the present ordinance.

5. The rank of assistant-apothecary is suppressed. The pupils and the assistant-surgeon shall be alternately employed in the service of surgery and pharmacy. The present sub-assistant apothecaries take the title of sub-assistant surgeon.

By the second chapter, or title, which treats of the army board of health, we are informed that the functions of this council consist in arranging the programme of the competitions and examinations to which the pupils and sub-assistant surgeons are subjected ; in forming part of the jury in the competitions, which take place at the finishing hospital for the ranks of sub-assistant surgeons, of assistant major-surgeon, and assistant major-apothecary, and for admission to the professorship ; in giving their opinion, and their opinion only, upon proposals of promotion made by the inspectors-general and the military intendants, and in those relating to the placing of assistant surgeon-majors and surgeon-majors in the special armed corps, the military hospitals, and the sedentary offices ; in presenting annually the test of capacity for the employment of assistant physicians ; in making medical inspec-

tions in the military hospitals, and with the troops when the minister orders them ; in submitting to the minister their views on improvements to be introduced into the service ; in giving their opinion in all questions referred to them by the minister ; and lastly, in maintaining an uninterrupted correspondence with the medical officers on every thing relating to the science and art of healing.

The third title organizes the hospitals of instruction and that of completion. Of the former class there are three, one at Strasbourg, one at Metz, and one at Lille ; that of the South continues to be private. The hospital of completion continues established at Paris. The dispositions contained in this title appearing insufficient, they were completed under a ministerial order of the 14th August 1837.

The fourth title regulates the conditions of the competition, at which it must be matter of surprize to see a military subintendant assist. These competitions are only for the places of pupils, of surgeon and assistant-apothecary major, and the office of professor.

Under title fifth are treated the admission and promotion of army medical officers and their placing. The conditions required for the admission of pupils having been found exorbitant and impracticable were modified by an order dated 6th February 1839. The present conditions are the following.

To be qualified for appearing at a competition the pupil must prove, *1st*, That he is a Frenchman ; *2d*, That he is above 16 and under 23 years of age on the 1st of January the year of competition ; *3d*, That he complies with the conditions of instruction required by the Faculty of Medicine to be allowed there to take inscriptions ; *4th*, Pupils of the Faculty of Medicine may compete, those who have passed the first examination with the mark *satisfied*, to enter for the first division the hospitals of instruction ; and those who have passed the two first examinations with the mark satisfied, to enter directly the military hospital of competition.

No one can be named sub-assistant surgeon, unless he has served as pupil, at least two years, in the hospital of instruction or in the hospital of completion. In order to pass assistant surgeon major, it is necessary to have served at least three years as sub-assistant surgeon, and to possess the diploma of doctor in medicine.

Four years of the rank of assistant major and the quality of graduate are required before being able to pass as surgeon major.

The assistant major surgeons and the majors begin to serve in the regiments of the line, the hospitals, the army sick waggons, and thence pass, half by seniority, half by selection, to the hospitals of the interior, the special arms or the sedentary officers, on a proposal made annually by the inspectors general and the military intendants.

The assistant major apothecaries are chosen from among the sub-assistant surgeons declared fit to be nominated assistant major surgeons, admitted doctors in medicine or masters in pharmacy, and recognized as capable after competition of performing the duties of assistant major apothecaries.

No one can be apothecary major unless he has served at least four years as assistant major apothecary, and unless he is doctor in medicine or master in pharmacy. Promotion to this degree takes place half by seniority, half by choice. The candidates for selection are presented annually by the military intendants. No one can be named for the rank of assistant physician unless he has served three years as assistant surgeon major, and in a military hospital at least one year, unless he is doctor in medicine and his capacity is established by the Board of Health.

Assistant major apothecaries, however, may be admitted to the employment of assistant physician, who have served at least three years in this rank, who are graduates, and whose competency shall be established by the Board of Health, but with the express exception, that they shall not be admitted to the office of assistant physicians in a proportion exceeding the fifth part of the vacancies in these offices.

It is requisite to have served two years at least, in the rank of assistant physician, and besides to be graduate, before becoming ordinary physician. Promotion takes place half by seniority and half by choice. Choice is regulated by presentations made annually by the military intendants.

No one can be principal physician, principal surgeon, or principal apothecary, unless he has served at least four years in the rank of ordinary physician, surgeon major, or apothecary major, and besides, in one of the ranks had served one campaign and performed the duties of chief medical officer of a corps of the army, or been chief director of a great establishment for two years, or unless he has been during this space of time first professor in an hospital of instruction.

All the offices in the rank of principal are given by choice.

In the interior the principal medical officers are employed only in the functions of first professor and chief officer of the hospitals of instruction, or as chiefs of other great establishments. They may be detached conditionally by the Minister of War and under the scientific direction of the Board of Health, to make medical inspections in the secondary hospitals and among the troops.

In time of war they are employed as principal medical officers of the army.

All the offices of inspection are by choice.

For the offices of medical professors the ordinary physicians and the assistant physicians, the assistant surgeons major, and the as-

sistant apothecaries major on the list for the office of assistant physician, are admitted indiscriminately to compete.

To compete for the offices of surgical professors, it is requisite to be surgeon major. But the competition is also open to the assistant surgeons major of the military hospitals, of the sedentary offices, and of the special arms.

The apothecaries major and assistant apothecaries major are alone allowed to compete for the vacant office of professor of pharmacy. A general condition is, that the candidate be doctor in medicine or master in pharmacy.

The offices of first medical, surgical, and pharmaceutical, are distributed according to choice upon the presentation of the military intendants.

The office of professor is independent of the rank of the medical officer who holds it. The first professor is chief of the service, whatever be his seniority.

The offices of professor to the hospital of completion are given by choice to the medical officers who teach in the hospitals of instruction the same course as that for which the office at the hospital of perfection is vacant. Nevertheless, when the Minister at War judges it suitable it is provided for in the way of competition.

The officers entitled professors are at the disposal of the Minister, and may be displaced according to the necessities and conveniences of the service exactly as other medical officers.

The seventh title, denominated that on subordination, treats of all the matters relative to the authorities over the medical officers, who, if placed or detached in the establishments dependent on the hospitals, the ambularies or the sedentary posts are under the orders of the military intendants, while the surgeons major and the assistant-surgeons major attached to corps are under the colonel or lieutenant-colonel, or the officer commanding in their absence.

The eighth title relates to pay; the ninth to uniform; and the tenth and eleventh to matters of local interest.

It further appears, that, according to recent instructions, the condition of the medical officers of the French army has been improved, both as to pay and also in other respects. The sub-assistants, who had only L.50, have now L.66, 13s. 4d. in the provinces, and L.84, 6s. 8d. in Paris. The assistant-major has L.125 at Paris, and L.84, 6s. 8d., in the provinces. The position of the surgeons-major and the higher officers has also been ameliorated proportionally. Two classes of assistant-majors and two classes of surgeon-majors have been formed. Hitherto the surgeons-major had been paid as captains of the first class. Now their pay approaches that of the heads of battalions. Hitherto

the inspectors, members of the Board of Health, had been only nominal inspectors; henceforward they will be real inspectors.

The next measure, however, relates to pupils. The Government assists families who are unable to educate their children for three years, when devoted to military surgery. These will receive an allowance of L.16, 13s. 4d. annually for the hospitals of Instruction, and L.25, annually for the Hospital of Completion. The duration of the education of military surgeons is fixed at three years; two years in the provincial hospitals and one in that of completion. But this duration may be reduced by two years, according to the number of examinations which the pupil has undergone before the Faculty; so that a pupil may enter directly at the Val de Grace, and leave it a sub-assistant at the end of one year.

The Government, further, is at the expense of the candidate's graduation, excepting and saving the fees of the professors, which reduces the expense more than two-thirds. In the case, however, of the medical officer who has received this favour, wishes to quit the service before fifteen years, he is bound to reimburse the Minister at War with the sum which the latter has paid to the Minister of Public Instruction for his degree.

With many of the arrangements, nevertheless, M. Fallot is by no means satisfied. He regards as very irrational the subjection of the medical officers to the military intendants, who, he maintains, are totally unfit for the duty by qualities, by want of knowledge, and, above all, by total want of sympathy as it were with the responsibilities and duties of the medical officer.

It appears, also, that at one time some foolish collisions took place between the commissaries and assistant-commissaries and the medical officers, and that the disputes continued for some time, creating ill will and mutual dislike between these bodies, and placing both in a situation the opposite of respectable and dignified. The best plan to avoid all improper collisions of this kind is to place, we believe, the medical officers under their own superiors in all matters relating to medical or surgical responsibility, and in the case of regimental surgeons under the authority of the commanding officer in all matters not relating to medical responsibility.

M. Fallot is most displeased that the distinction between physicians and surgeons is maintained in the military hospitals of France, while it is notorious, he adds, that in civil life every practitioner provided with the diploma of graduate practises, by virtue of this title, all the branches of the art of curing, or, if he wishes to confine himself to one, he practises that for which he feels he has most taste and capacity. There seems little ground, it appears to us, for censure here. To us it appears quite indispensa-

ble, that all members of the profession ought to receive the same education,—education comprehending all the branches, elementary and practical, of medicine, surgery, and perhaps of midwifery; and we should like also that each individual so trained should keep up his stock of information, and always be on a level with the knowledge of the day in each department. The physician undoubtedly ought to possess a competent knowledge of surgery, seeing that many cases in which his advice is required may partake of the character of local disorders, that many symptoms may depend on mere local causes; and without thorough knowledge of these, he cannot be a safe adviser. The surgeon in like manner ought to possess a tolerably extensive and accurate knowledge of medicine and medical pathology and semiology, since without these he will neither think of studying all the peculiarities of the cases submitted to his notice, nor will he always understand well the origin and nature of various disorders in which his assistance is required. And both ought to possess some knowledge of the disorders peculiar to females, both in the pregnant and the unimpregnated state.

We are further at a loss to understand with what justice M. Fallot can appeal to the practice in civil life as an example to that in the army medical department. For here the appeal is decidedly against his argument. He surely does not mean to say that, because there are general practitioners of medicine and surgery both in France and England, there are, therefore, neither physicians nor surgeons. What has become of all the hospital physicians and hospital surgeons of Paris and London. Is the race extinct, because in country and provincial towns all practice comes alike to all? Assuredly the example of civil life is decidedly opposed to the inferences of M. Fallot. Pure physicians exist, because it is impossible to do without them, and consulting and operating surgeons will equally exist, because the wants of society require them.

Upon the whole, it appears that the method pursued in England is most completely fitted for the purposes of military life. We have already shown that, in ordinary circumstances, the necessity for surgery and surgical operations is very limited. The great business of the medical officer of the army is the preservation of the health of the men committed to his care, and this he does partly by prophylactic measures, partly by curative means. He is the medical superintendent of the troops, the medical adviser of the commanding officer, and hence, whether entitled surgeons or not, it is right that they should be considered as medical officers.

Of the merits of some other parts of the arrangement we are less qualified to speak. And our limits will not allow us to go further into detail.

PART III.

MEDICAL INTELLIGENCE.

PHYSIOLOGY.

On Venous Absorption. By Professor PANIZZA. (*L'Experience*, 11th May 1843.)—Professor Panizza, in order to set at rest the disputed points as to whether absorption was accomplished by the vein or by the lymphatics, performed a very extensive series of experiments on living animals. His first experiments were limited to administering certain saline substances to man and animals, and examining the blood, the urine, and the faeces. These salts were nitrate of potash, prussiate of potash, hydriodate of potash, tartrate of antimony, chloride of barium, acetate of lead, sulphate of iron, &c. No very important results were arrived at in consequence of this mode of experimenting. The insoluble mineral salts, or those which became decomposed in the stomach, were found in the faeces. The soluble salts were almost entirely thrown off by the urine; in this case they were only found in very small proportion in the blood; this probably depending on those being thrown off by the kidney nearly as fast as they were absorbed into the circulation. The preparations of iodine, however, were found to be secreted pretty freely by the skin, and also with the saliva. A cotton shirt worn next the skin for thirteen days while taking hydriodate of potash, on being tested, furnished distinct traces of iodine. Several insoluble metallic compounds were found to pass into the circulation. Thus kermes and æthiops mineral, chloride of silver, lead, metallic mercury, and iron filings, were recognized in the blood after being introduced into the stomach; so that the animal economy possesses the power of creating soluble compounds, though their nature has not yet been determined by the chemist.

Having by these experiments ascertained what substances passed through the blood, and the most appropriate tests for each when mixed with the animal fluids, two dogs were fed for three days with soup, in which was a considerable quantity of prussiate of potash. The third day they were opened alive to test the fluids and examine the tissues. When the inner surface of the intestinal tubes was touched with a solution of chloride of iron it instantly became of a bright blue colour—and this from the mouth to the anus. The urinary passages yielded the same reaction. About fifteen minims of fluid lymph were procured from the thoracic duct, it yielded no perceptible reaction. The blood from different arteries and veins was filtered through paper steeped in a persulphate of iron, a few drops of nitric acid being previously added; but the only blood which exhibited distinct reaction was that coming from the veins of the small intestines. The serum of this blood tinged the filter of a blue colour.

An ass was fed five days with food mixed with hydriodate of potash.

It was opened alive, and blood collected from the mesenteric veins, mesenteric artery, and *vena portæ*, a large quantity of chyle from the thoracic duct, the urine, faeces, and chyme were all separately examined. Iodine was found in all, but existed in almost inappreciable quantity in the chyle or lymph from the thoracic duct.

The most decisive experiment which Professor Panizza states, he has often repeated, one, too, which has often been made by other physiologists, and which seems to prove that the veins are the chief agents in absorption, was the following. A horse was thrown to the ground, its intestines laid bare, and a portion of the small intestines, whose veins, after a short course, terminated in one trunk, was selected for experiment. This loop of intestine, about nine inches in length, was included within double ligatures, so as to separate it from direct communication with the rest of the system; only allowing it to receive a supply of blood by one arterial trunk, and carry back the blood by the one venous trunk above alluded to. A brass tube was then introduced through a puncture into the intestines, and a ligature passed around the only vein which carried the blood back to the heart; in order not to stop the circulation, however, the vein was punctured between the ligature and the intestine. About three drachms of concentrated hydrocyanic acid were then poured into the intestine through the brass tube, and the tube instantly closed. The blood which flowed from the intestine was collected, and was found instantly to give out a strong odour of hydrocyanic acid or oil of bitter almonds. When tested, by treating the blood first with carbonate of potash, then by muriate of iron and a few drops of nitric acid, the characteristic blue colour was struck. The animal, in the meantime, exhibited no symptoms of poisoning, though the nerves and lymphatic vessels of the loop of intestine were untouched.

In another case the vein was only held compressed for two minutes after the introduction of the acid, during which no poisonous symptoms were exhibited; but the moment the pressure was taken off, at least within a minute and quarter, all the characteristic symptoms of poisoning by that acid were manifested.

In other cases the intestine was only connected to the body by the artery and vein, and then the poisonous symptoms were manifested within the minute. But if the blood from the vein were allowed to escape, even though the nerves and lymphatic vessels were entire, no poisonous symptoms were ever manifested. The poisonous acid was all thrown off with the blood.

The same kind of experiments were repeated with hydriodate of potash, &c. The salt used was always found in large quantity in the blood coming from the loop of intestine, but not in the lymphatic vessels.

Professor Panizza made a number of experiments on dogs and other animals by cutting the nerves of the lips and tongue before applying the hydrocyanic acid, to ascertain whether the absorption by the veins would be prevented by depriving the part touched by the acid of its nervous influence. The animals were poisoned as quickly as if the nerves had been entire. In several cases he used precautions to prevent the vapour being breathed, but the same result followed.

Some experiments were also made with the view of determining accurately whether by breathing the vapours of substances they were introduced into the blood. It was satisfactorily found that they were, being discovered in considerable quantity in the blood. From his experiments, Professor Panizza concludes that secretion and absorption take place by means of porosities in the capillary system, as no free open mouths have yet been discovered; that absorption takes place by lymphatic vessels and by veins; that substances are the more easily absorbed in proportion as they are soluble, divisible, and capable of being assimilated. That many mineral sub-

stances continue to manifest their presence in the blood and urine many days after they have ceased to be administered. That medicines are absorbed into the blood, circulate with it, and afterwards act on the nervous system; consequently the blood is the way by which medicinal agents arrive at, and transmit their action to the nervous system.

Quantity of Air inspired at different Ages. By M. BOURGERY. (*Comptes Rendus des Seances de l'Academie des Sciences*, 23d January 1843.)

—By means of a hydro-pneumatic apparatus, M. Bourgery has constructed a table of the relative amount of air respired by 70 individuals, 50 of the male, and 20 of the female sex. The conclusions to which he has arrived are the following.

1. All circumstances being equal, the respiration in relation to the organism is so much the more powerful as the subject is more young and slender. No other condition of strength or health supplies the place of youth.

2. Virile respiration is, at the same age, double the volume of that of the female; a fundamental difference which enables us to explain the superiority of the vital acts and organism in the male over that of the female.

3. The respirations in both sexes attain their maximum in amount at the age of 30 years, a period which corresponds to the complete development of the aerial capillaries of the lungs. In the well formed individual, the amount of the forced respiration at this age, in the male sex, is from 2.50 litres to 4.30 litres; in the female from 1.10 litres to 2.20 litres. The youth of 15 years inhales two litres. The old man of 80 years, 1.35 litres. (The litre is 16 cubic inches English, or 1.7608 imperial pints.)

4. The volume of air of which an individual has need for an ordinary inspiration augments gradually with age. The relations between the ages of 7, 15, 30, and 80 years, are geometric, and are represented by the numbers, 1, 2, 4, 8. The perfect adult habitually respire quadruple the quantity of the young child, and double that of the woman and of the boy of 15. The old man respire double that of the adult. The progressive augmentation, or the want of a larger volume of air, only expresses the diminution of energy of the pulmonary oxygenation; that is to say, that this relative faculty decreases from infancy to old age in the proportion represented by fractional numbers, the reverse of those above, viz. $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$.

5. In forced respiration, the aerial capacity or the permeability of the lungs to air presents two periods; the one ascending, from infancy to 30 years of age; the other descending, from 30 to old age. The first augments in the regular proportion of 1, 2, 3, from 7 to 15 and 30; the second diminishes in the proportion of 3 to $2\frac{1}{2}$, from 30 to 50 years of age; and from $2\frac{1}{2}$ to $1\frac{1}{2}$ from 50 to 80 years of age.

6. The weakening of the respiratory powers with age ought to hold a considerable part in the gradual extinction of the powers.

7. In proof of this last proposition, the relation of the ordinary inspirations to the forced inspirations diminishes with age. It is as 1 to 12 at 7 years of age; as 1 to 10 at 15 years; as 1 to 9 at 30 years; as 1 to 6 at from 35 to 40 years; as 1 to 3 at 60 years; as 1 to $1\frac{1}{2}$ or 1 to $1\frac{1}{4}$ at 80 years. From which it results, that the youth possesses in violent movements, an immense respiratory faculty in reserve, whilst the old man is immediately blown from want of this.

8. The difference of the volume of air in a forced from that in an ordinary inspiration, indicates, at different periods of life, the relative powers of oxygenation which characterize them.

9. The respiratory powers waste of themselves by the tearing of the capillary air cells and blood-vessels,—improperly called emphysema of the lungs.

10. The last result of senile emphysema, without other malady, is to assimilate the cavernous lung, and the imperfect respiration with the half-black half-red blood of decrepit age, to the lobed lung and incomplete respiration of the reptile.

On the presence of Vegetable germs in the fluids of Animals. By MM. ANDRAL and GAVARRETT. (*Comptes Rendus des Seances de l'Academie des Sciences*, 30th January 1843.)—M. Liebig announced in 1841, in a letter to the Academy of Sciences, that he had succeeded in precipitating albumen, in the form of globules, by adding a large quantity of water to serum rendered neutral by an acid. MM. Andral and Gavarrett repeated this experiment and produced the same result, but assert that these globular bodies into which the albumen is thrown are nothing else than the rudiments of vegetables, which M. Turpin has shown are produced in all vegetable infusions on fermentation. After having found these so-called vegetable germs in the serum of blood, they experimented in a similar way on the white of the egg, the different forms of serous fluid produced by diseased action, and the serous part of purulent matter, and met with the same bodies in all these. In every albuminous fluid, when deprived of its alkalinity, they found these globular bodies, which they regarded as vegetable, were produced, and they think that the knowledge of these being vegetable may prove of no small utility in physiology and pathology.

On the causes of Cadaveric rigidity. By M. E. BRUECK. (*Muller's Archiv*, November 1842.)—M. Brueck attributes cadaveric rigidity to the coagulation of the liquids in the interior of the tissues. From observing that the blood, which is fluid in the body coagulates when drawn from it, he thinks that a similar change occurs in the muscles after death. During life the fibrin of the blood is found dissolved in the *liquor sanguinis*; but after death this fibrin is precipitated, and coagulates, imprisoning in its meshes the blood globules. The fibrin of the blood coagulates when the organized part of the blood dies; and M. Brueck affirms that the fibrin of the muscle coagulates, when the muscular fibre, the organized part of muscle, is deprived of life.

Case of Precocious Puberty. By M. RUELE of Cambrai. (*Bulletin de l'Academie Royale de Medecine*, February 1843.)—The subject of this case was born at Cambrai the 7th of April 1839, and seen by M. Ruelle a few days after his birth. He was then very small and feeble, and had no strength to take the breast; indeed, it was six weeks after birth before he was able to suck. M. Ruelle lost sight of him till the month of August last, when he was three years and four months old. He had the appearance of a boy about eight years of age. His head was large yet proportioned to his body. His muscles were well developed; he had twenty teeth widely separated from each other; he was vigorous; had a voracious appetite; and an understanding greatly beyond his years. The down on his cheeks and upper lip was black and very apparent. His penis when flaccid was 3½ inches long; the glans was uncovered; the pubis was covered with long black hairs; and the testicles were well developed. The penis became erected whenever it was touched. His mother said he was given to masturbation, which she found it almost impossible to prevent; and that each time a small quantity of seminal fluid was ejected.

MEDICAL PATHOLOGY AND THERAPEUTICS.

Worms in the Blood of the Dog. By M. GRUBY. (*Comptes Rendus des Seances de l'Academie des Sciences*, 30th January 1843.)—M. Gruby, on examining the blood of a healthy dog by means of the microscope, discovered moving in it a number of worms like *filariæ*. They appeared to be the fourth

of a millimetre in length, and from the 3000th to the 8000th of a millimetre in breadth. These bodies were colourless and transparent. The anterior extremity was obtuse, the posterior or caudal extremity ended in a fine filament. At its anterior extremity a short groove or fissure was noticed, which was regarded as the mouth. The movements of the animals were very lively. They lived ten days after the blood was drawn from the body, and was kept in a vessel at the temperature of 15° Cent. When observed under the microscope these hematozoaria were seen to swim with an undulatory movement between the blood-globules. For twenty days the blood of the dog was examined daily, and these filii worms constantly found present. They were not, however, found present in either the excrements or urine. It was estimated that very nearly 100,000 of these worms existed in the blood of this dog. This dog, though healthy, must have been in a diseased state, since M. Gruby stated that he had since examined the blood of from 70 to 80 dogs, and not found any of these worms in any of them; and Delafond had examined the blood of 15 dogs, and not found them present in any.

On Pulmonary Tubercles. By M. BOUDET. (*Comptes Rendus des Séances de l'Académie des Sciences*, January 16, 1843.)—M. Boudet establishes by his researches that the tubercular degeneration of the lungs and bronchial ganglia in man is much more common, and more curable than most physicians are aware of. Having examined the lungs of 197 persons who died in the hospital of various diseases, or were killed suddenly by accidents, he has detected tubercles in the lungs of one child under two years of age; from this age to that of 15, tubercles existed in three-fourths of the cases; and in those between 15 and 76 no fewer than six-sevenths of the bodies exhibited the tubercular deposit in the lungs. This result is explained, according to M. Boudet, by the facility with which the tubercles undergo a change in their intimate constitution, by which they become not incompatible with a state of health. These modes of cure he states to consist of sequestration, induration, with their cohesion increased or diminished, calcareous induration, absorption, and elimination. In the calcareous degeneration the carbonates and phosphates of lime form but a small proportion; seven-tenths of the concretions are formed of the chloride of sodium and the sulphate of potash. The cure of tubercles may take place at every period of life, but it is more common as the age increases. It also occurs at all stages of evolution of the tubercles. M. Boudet has also observed the cure of tubercles in the living. In less than one year he has collected 141 cases, from the examination of which he draws the following conclusions.

1. Persons who have presented marked symptoms of phthisis, even in the last degree, may, after a longer or shorter time, and for many years, enjoy excellent health.

2. Notwithstanding this general satisfactory state it is always easy to detect the existence of more or less extensive local lesions.

3. Phthisis transmitted by hereditary descent seems to be less capable of cure than accidental phthisis.

4. Nature performs by her own efforts these cures. For observation has proved that phthisical patients, left to themselves, or treated by the most opposite means, have recovered their health.

5. Amputation of limbs in the phthisical ought not to be absolutely proscribed. In three phthisical youths, labouring under severe affections of the lower limbs, the health was completely restored after the amputation of the diseased limb.

Case of Scirrhus contraction of the Œsophagus, probably produced by a Prune Stone. By M. BERARD. (*Bulletin de l'Académie Royale de Médecine*).

cine. February 1843.)—The subject of this case was a patient in the Hospital of La Pitie. He suffered from a contraction in the oesophageal tube, which rendered swallowing difficult, and gave rise to all the ordinary symptoms attending that complaint. The sound was constantly arrested behind the larynx, and liquids, which were endeavoured to be injected, flowed back into the mouth instead of descending to the stomach. Whenever the sound was introduced it was remarked that it rubbed against some hard rough body, which was supposed to be the cricoid cartilage. The patient died under an attack of pneumonia, and the parts presented the following appearance.

The contraction of the oesophageal tubes was great; and for about the third of an inch in extent the whole thickness of the tube was of a scirrhous hardness. Above this was discovered a prune stone, which acted as a kind of valve, which neither the sound nor liquids could displace so as to allow them to pass the contracted portion of the tube. The presence of this body explained the sensation of a hard rough body detected by the sound, but mistaken for the cricoid cartilage.

Physiological and Therapeutical Action of Arsenic in Sheep. By M. GASFARIN. (*Comptes Rendus des Seances de l'Academie Royal des Sciences*, 2d January 1843.)—M. Cambessedes had a flock of sheep affected with chronic pleurisy, under which many had fallen victims, and the rest were in a hopeless state. Having heard that arsenic in large doses had proved efficacious in this complaint to twenty of these animals, he administered eight drachms of arsenic in powder mixed with common salt. Of these, eighteen perfectly recovered, and two only died, eight days after the mixture was given. Encouraged by this success, he administered arsenic in the same manner to the rest of the flock—upwards of an hundred, and of the whole number he only lost seven. Arsenious acid given to sheep in a state of health was followed by no bad consequences, and M. Cambessedes found that oxen equally remained uninjured by this powerful poison.

In consequence of this remarkable fact, the Academy appointed a commission to inquire into the fact and report. On their next meeting, M. Magendie, in the name of the commission, stated that two sheep had had doses of arsenic administered to them. They were kept fasting previous to this for 48 hours. The one swallowed two and a-half the other five drachms of arsenic, in two equal doses, with an interval of 24 hours between each dose, and both died.

From a note appended by MM. Danger and Flandin, it would appear that the pretended innocuity of arsenious acid in these animals depends on its not being, or but sparingly absorbed. They caused a sheep to swallow four drachms of this poison in two doses, with an interval of 24 hours; the first only of these doses was mixed with an equal quantity of sea salt. They then examined the urine and *faeces*, and found the arsenic in great abundance in the latter, but very sparingly in the former. They are therefore not surprised that its toxicological effect should not be great.

As a counter experiment they introduced four and a-half grains of arsenious acid under the skin of the thigh of a sheep, which was immediately followed by the usual poisonous effects. The urine of the animal also became more and more loaded with the arsenic; it died the fifth day. It is mentioned as a very curious circumstance, that the chief morbid lesion discovered was pleuritic effusion,—the very disease for the cure of which arsenic had been so successfully administered by M. Cambessedes. In a third experiment, they caused a sheep to swallow eight drachms of arsenious acid, mixed with a handful of salt. Soon after began to suffer from violent colic, and from that moment refused all nourishment. The first urine passed at the end of 16 hours, contained a notable quantity of arsenic

and the faeces contained an enormous quantity. The sheep, however, recovered.

M. Rognetta, who also experimented on the subject, found that the horse tolerates eight drachms of arsenic in powder, or fifteen grains in solution; but it required double of these doses to cause death. Similar phenomena were met with in other animals, as in rabbits. From these experiments, M. Rognetta thinks that the good effects obtained by M. Cambessedes with eight drachms of arsenic in powder, would have been obtained with an aqueous solution of fifteen grains of this same substance. This dose does not appear to M. Rognetta to be enormous, when regard is had to the tolerance which the disease would undoubtedly give to the poison, and seeing also that the arsenic would in that disease have acted as an antiphlogistic.

In further prosecution of the same experiments, MM. Danger and Blandin stated to the Academy, on the 27th February, that they had killed the sheep to which they had thirty-eight days before administered four drachms of arsenic, that they found the whole structures healthy, without traces of inflammation or disease. They had also analyzed the various parts of the body, and neither in them, nor in the muscular substance, could detect the faintest traces of arsenic. A young dog was fed on the viscera, but received no hurt; and neither in its urine nor feces were any traces of arsenic discovered. Six persons partook of the flesh of the sheep, and one of the experimenters lived for six days on it without suffering any inconvenience therefrom.

The Strongylus armatus minor of Rudolphi, the cause of Aneurism in the lower Animals. By M. RAYER. (*L'Examineur Medical*, 1st March 1843.)—The development of worms in the cavity of certain arteries, or in the walls themselves, is a pathological fact which is as curious as it is little known. Ruisch was the first to observe worms in the mesenteric artery of the horse; this was in 1665. Schulze noticed the same fact in 1725. Morgagni saw them in the walls of the aorta of several dogs in 1730. Chabert was the first in France to describe them as existing in the arteries of the horse. Sabatier states, that aneurisms caused by worms, of whose existence in man he was not aware, were of pretty frequent occurrence in quadrupeds. M. Rayer affirms, that, although aneurism caused by worms is common in the horse, ass, and mule, it has never, so far as he is aware, been observed in the arteries of any other quadrupeds, dogs alone excepted; and he is therefore inclined to believe that aneurisms produced by worms must be rare in the lower animals. Of 50 horses which he saw slaughtered, he met with this form of aneurism in 48; the aneurism produced by these worms being situate in the anterior mesenteric artery. He has never met with a similar morbid formation in the dog; indeed, in this animal the worms have only been found in the aorta, and these only by Morgagni and Courten.

Vermineous aneurism in the domestic solipeds is developed almost always in the anterior mesenteric artery, and in that case all the forms of true aneurism may be recognized. Most commonly the aneurismal tumour is of a fusiform shape. Occasionally the cavity of the artery is almost entirely filled by a fibrinous clot; at other times there is only a thin fibrinous layer deposited on the walls of the artery. In this last case the strongylus is not always observed; or, if the worms are present, they are in small numbers and attached to the fibrinous deposits. When the fibrinous clot is large the strongyli are always in considerable numbers. The external layers of fibrin are always the densest, and the strongyli are found between them. The different coats of the vessel are thickened, and the internal coat has lost its transparency; but it is rarely found ulcerated. The causes of this form of aneurism do not appear to be yet known. The strongyli

of the arteries resemble those of the intestines; they are only smaller. There are more females than males. Some are free in the cavity of the vessel; but the most of them are buried in the fibrinous clots. The free extremity of the worm, which projects beyond the clot, is most commonly the tail.

On the Successful employment of Belladonna as a prophylactic during the prevalence of Epidemic Scarlatina. By M. STIEVENART of Valenciennes. (*Bulletin de l'Academie Royale de Medecine*, February 1843.)—An epidemic scarlatina ravaged, during the winter of 1840-1, several villages in the neighbourhood of Valenciennes, when Dr Stievenart was induced to try the prophylactic properties which belladonna is said to possess against this disease. The circumstances rendered any trial of this kind of double value, as, on account of the fatality of the epidemic, 30 patients had already died out of 96 seized. In a small village, out of 250 individuals, 200 took belladonna, and were all preserved from the attacks of scarlet fever. Of the 50 others, 14 were seized with the disease and four of them died. At the village of Curgies Dr Stievenart administered the belladonna to the children at the public school, and allowed them to continue at their lessons and have communication with the other children of the village. All to whom the belladonna was administered escaped the scarlet fever; but a few who refused to take it were seized with the disease.

The belladonna was administered in two forms; in solution, or as a powder. Two grains of the recent alcoholic extract of belladonna were dissolved in an ounce of any aromatic infusion, and of this two drops were given to a child of one year old daily for nine or ten days. An additional drop was given for every additional year of age. The largest daily dose was, however, limited to twelve drops. When the belladonna was given in the form of a powder, half-a grain of the powder of the root was mixed with a small quantity of sugar and divided into ten doses. One of these was given, morning and evening, to children of from one to two years old; two powders, morning and evening, to those from three to five; three powders to those from six to nine; four to those from ten to fourteen; and five to adults.

These small doses never produced the toxicological effects of belladonna; in fact, they scarcely ever had any marked action on the animal economy. In five or six cases Dr Stievenart observed a rash similar to that of measles; and, in a few other cases, headach with dilatation of the pupils, dryness of the throat, and slight sore throat, but which had no resemblance to that of *scarlatina anginosa*. In all the others no sensible or apparent effect resulted from the administration of the remedy.

Dr Stievenart generally continued the use of the remedy for from nine to ten days, in some cases, it was given for fifteen days. He thinks this period sufficiently long to put the system under the influence of the preservative powers of the remedy; but recommends to return to it if the epidemic return or break out again with renewed violence.

A few of the recorded instances in which belladonna has been successfully administered as a prophylaxis are noticed. Bayle in 1830 published a notice on this subject, by which it appears, that of 2027 individuals to whom belladonna was administered, 1948 were preserved from scarlet fever, and seventy-nine were attacked with it. Dusterberg, by means of belladonna administered for two weeks, preserved from scarlet fever, all those who took the medicine. In order to ascertain the real value of the remedy, he purposely omitted to administer it to one child in every family, and this child alone, according to his report, was seized with the disease. He adds, however, that scarlet fever occasionally seized a child who had only been taking the remedy for three or four days, but was always in this case mild, and often only manifested its presence by desquamation ensuing.

Zeuch, physician of the Military Hospital for Children in the Tyrol, after eighty-four children were seized with scarlet fever, was induced to try the prophylactic effects of belladonna on the remaining sixty-one children. With a single exception all were preserved from its attacks, though the disease was raging around. Schenk, Berndt, Kohler, Meglin, De Lens, and other distinguished physicians speak in equally high terms of the prophylactic properties of belladonna.

MATERIA MEDICA.

On the Identity of Gelatin in its ultimate composition with Legumin, Albumen, &c. By MM. DUMAS and CAHOUS. (*L'Experience*, 15th and 29th December 1842.)—In an interesting paper these expert chemists, after showing the absolute identity of fibrin, albumen, and casein in the animal kingdom, extended their researches to the vegetable, and found that legumin, vegetable albumen, vegetable casein, &c., possessed the same identical ultimate composition as the azotized principles of the animal kingdom. The composition of all these bodies in the animal kingdom seemed to come very nearly, striking off fractional parts, to carbon, 53; hydrogen, 7; azote, 16; and oxygen, 24; in the 100 parts. In the vegetable kingdom legumin and gluten were found by Liebig to possess the identical same composition, so that the numbers for them would also stand, carbon, 53; hydrogen, 7; azote, 16; and oxygen, 24; in the 100 parts. M. Dumas and Cahours, perhaps, from separating these principles more completely from the oily matter with which they are usually more or less associated, find the quantity of carbon to be a fraction less in the 100 parts, and consequently, the proportion of azote and oxygen a fraction greater,—not, however, so much as to destroy the notion of their identity, but rather more strongly to prove it. They found the legumin from various sources, as from pease, lentils, haricot beans, sweet almonds, kernel of prunes, of apricots, and white mustard seed, to give the following average result in 100 parts, carbon, 50.9; hydrogen, 6.5; azote, 18.5; oxygen, 24.1. From this they deduce the absolute identity of that substance with albumen, fibrin, and casein in the animal kingdom. They also show that vegetable albumen and gluten have the same identical composition. Gelatin, which has been by Liebig regarded as of an entirely different composition from these substances, these expert chemists found to possess the very same ultimate composition as the above agents, finding that in the 100 parts it consisted of carbon, 50.99; hydrogen, 7.07; azote, 18.72; and oxygen, 23.22. It thus appears that the whole azotized substances, both of the animal and vegetable kingdom, are, after all, but simple modifications of one another, yet in ultimate composition exactly the same.

On the state in which the Sulphur exists in the mineral Springs of the Pyrenees. By MM. BOULLAY and HENRY. (*Journal de Pharmacie*, April 1843.)—Professor Anglada ascertained in 1827, that the sulphur which gives the medicinal properties to the mineral waters of the Pyrenees, existed in the state of a hydrosulphate of soda, or sulphuret of sodium. M. de Longchamps and M. Orfila arrived at the same conclusion, confirming the observations of Anglada. This statement has been several times since contradicted, and it has been endeavoured to be proved that the sulphur existed in the state of hydrosulphate of the sulphuret of soda, or, according to the old expression, as a bihydrosulphate of soda. MM. Boullay and Henry, from numerous experiments, arrived at the conclusion that the sulphur exists as a neutral sulphuret of sodium, (hydrosulphate of soda,)—a fact which they think it is of some importance for the physician to be aware of in prescribing its use or endeavouring to imitate it.

On the Cyanuret of Potassium. By M. ORFILA. (*Archives Generales*

de Medecine. February 1843.)—As the cyanuret of potassium has been of late much employed in medicine, and several fatal cases have resulted from its use, M. Orfila directed his attention to the subject to ascertain the probable cause of these unfortunate cases. This preparation has been usually given as a substitute for the hydrocyanic acid, having similar properties, and the following are the chief results of M. Orfila's investigations.

The cyanuret of potassium, prepared according to the method of Wiggers, *i. e.* by passing a stream of hydrocyanic acid gas into a solution of pure potash, or by calcining the yellow ferrocyanate of potash, is an extremely energetic poison, capable of occasioning instant death in the dose of a few grains; and its action is precisely similar to that of hydrocyanic acid.

The so-called cyanuret of potassium, obtained by calcining dried muscle with potash, as it is prepared in many manufactories, and by several pharmacutists, contains scarcely any cyanuret of potassium. It is chiefly composed of carbonate of potash, chlorides, &c., and has no more action on the animal economy than so much carbonate of potash. Experiment has shown that this preparation has been prepared with an excess of potash, and it is a known fact that the cyanuret of potassium, at a red heat, in such a case is transformed into ammonia and the formiate of potash, which last soon passes to the state of carbonate. It is the fact of two preparations existing, the one energetic in the smallest dose, and the other useless in the largest, that has led to several patients having fallen victims to it. The practitioner finding no result from a large dose of the one, is apt to try a similar dose with another, who, getting the energetic preparation instead of the useless one, falls a victim to its activity.

M. Orfila also found that the cyanuret of potassium is not nearly so easily decomposed as is imagined, even boiling it for several hours, and leaving it exposed for a considerable time, failing to decompose it completely.

SURGICAL PATHOLOGY AND THERAPEUTICS.

Cure of an erectile Tumour of the Face by means of the Vaccine Virus. By M. PIGEAUX. (*L'Esperience*, 5th January 1843.)—The tumour was the common erectile tumour so often observed in infants. It was not noticed at birth, but when the child was about six months old appeared of about the size of a pin point on the forehead, when it rapidly enlarged to its present dimensions, nearly an inch square, and projecting about three lines above the surface of the adjoining integuments. The tumour nearly disappeared under pressure, but returned the moment the pressure was removed; and whenever the child cried or forcibly exerted itself it swelled up and became of a deeper red colour. It was resolved, on consultation, to try the efficacy of the vaccine virus. The vaccine virus was introduced carefully below the cuticle in nine places over the tumour itself. Very little blood oozed from the slight scratches, but was easily arrested by pressing over the tumour with the point of the finger dipped in fresh vaccine virus. Two scratches were at the same time made over a similar tumour which was situate in the lumbar region.

On the fourth day the vaccine pustule began to show itself. The tumour became of a brown colour and was swollen, and seven small pustules appeared over the tumour, but they remained small till the ninth day. At this period they enlarged much and became confluent. On the twelfth day the crusts formed, and the tumefaction of the erectile tissue was visibly abated. On the twenty-fifth day the crust became detached, when it was found that the surface of the tumour was destroyed, its surface was reduced below the level of the surrounding skin, but the bottom of the wound still contained some red areolar tissue from which blood oozed. This was dressed with powdered alum, and compresses applied, and when the wound healed the tumour was found to have completely disappeared.

The two scratches which had been made on the lumbar tumour had also produced vaccine vesicles, but they had not coalesced, did not include the whole tumour, and when the scales fell off they left a portion of the erectile tumour untouched between them.

From the success of the operation on the tumour on the face, M. Pigeaux recommends that the whole surface of the tumour be, if possible, included in the vaccine inflammation; and, instead of the punctures being made at the circumference of the tumour, that they be made over the whole surface. No portion of the tumour will then escape the inflammatory action, and the disease will stand every chance of being permanently removed.

Extirpation of the Salivary Glands in Animals. By M. BUDGE. (*Médecinsche Zeitung*, November 1842.)—In his researches on the saliva, M. Budge constantly found that fluid alkaline, before as well as after a repast. This alkaline reaction was found to exist in animals even after a prolonged fast. To ascertain what effect the salivary glands had on the alkalinity of the buccal secretions, M. Budge extirpated the whole of the salivary glands of a dog, viz. the parotids, submaxillary, and sublingual glands of both sides. The dog survived the operation, but the buccal secretions were constantly found alkaline. When the dog was killed at the end of a month, the fluid of the stomach was found slightly acid. The same operation was repeated in a rabbit, and with the same success,—the buccal secretions remained alkaline.

On the employment of Belladonna in the treatment of Phimosis and Paraphimosis. By M. DE MIGNOT. (*L'Esperance* 16th December 1842.)—M. de Mignot having derived benefit from the application of an ointment of belladonna in cases of phimosis and paraphimosis, recommends its employment in every case before having recourse to the knife. The ointment is made in the proportion of 12 grains of the extract of belladonna to 30 grains of simple cerate, and with this the prepuce is rubbed every hour. The dilating power of the belladonna soon begins to act, and in many cases an operation may be avoided. When the inflammation is violent and the pain intense he recommends to add a little opium and mucilage of quince seeds.

Inversion of the Uterus, with Strangulation of a portion of the Intestine. By M. A. GERARD. (*Bulletin de l'Académie Royale de Médecine*, March 1843.)—A healthy woman, 30 years of age, had an easy delivery of her second child; but the placenta adhered, and the midwife who attended her not being able to effect its removal, even after the use of considerable violence, sent for a young surgeon, who, with some difficulty, extracted it, but immediately left the patient, saying that she was injured, and that he would not undertake the responsibility. Very shortly after this, nausea, vomiting, hiccough, faintings, and cold sweats came on, and she died in about three hours thereafter, nothing having in the interval been done to relieve her.

As the death of this person made a noise in the place, M. Gerard was ordered by the authorities to examine the body, which was done fifteen days after death. The uterus was found inverted; the fundus having been drawn through the uterine orifice, which had contracted strongly over it, formed a large tumour in the vagina, nearly filling it completely. When the uterine tumour was examined from the abdomen, it was found to form a kind of deep pouch, of about six inches deep, and three and a-half inches broad, within which was contained, and held strongly strangulated, a loop of the small intestines, of about twelve inches in length. The length of time which had elapsed since death took place did not allow any very satisfactory conclusion to be drawn from the colour of the parts; but the fact

of a portion of the small intestine having been found strangulated in the inverted uterine sac, sufficiently accounted for the suddenness and severity of the symptoms, and the rapidly fatal result.

Spontaneous Cure of an Uterine Polypus. By M. MARCHAL. (*Bulletin de l'Academie Royale de Medecine*, March 1843.)—A woman, 48 years of age, had for three years suffered from uterine hemorrhage, accompanied with lumbar pains, and feeling of weight in the pelvic region. One day, while heating water in a large cylinder for a bath to herself, she felt, as she raised herself up, a sensation like something giving way, or tearing within the pelvis, and immediately thereafter there escaped a body from the vulva, which she took for a bird's heart. M. Marchal recognized it to be a polypus, wholly formed of uterine tissue, a true pedicular prolongation of the uterus, as described by MM. Berard, Cruveilhier, and Velpéau. It was about an inch long, and three-fourths of an inch broad, and consisted of a body and a pedicle. The body was smooth, and the pedicle presented the appearance of having been recently torn off.

Case of Successful Reparation of the Lower Lip. By M. BLANDIN. (*Bulletin de l'Academie Royale des Medecine*, March 1843.)—The subject was a young man of 28 years of age, who had lost two-thirds of the lower lip, in consequence of a cancerous affection. The teeth, gums, and jaw were exposed, and the saliva continually flowed from the large aperture. A large triangular flap of such a form as to fill up the vacuity was raised from the chin and lateral portion of the neck; the edges of the old sore were paired, and the flap attached by means of the twisted suture. The operation was followed by complete success, and three years after the operation the repaired portion of the lip was more perfect and better than when first raised. The internal surface exhibited a perfect mucous surface, and possessed the same red colour and appearance as the portion of lip which had not been destroyed. In fact, the only difference which was observed between the portion of the lip which had been repaired and the sound original portion, was, that the hairs sprung from the very edge of the lip; whereas on the original portion of the lip it was smooth for a little way below its free margin. In fact, the repaired portion of the lip supplied the place of that which had been destroyed so well, that the lip was nearly as perfect as before it was destroyed by the cancer.

Successful case of operation for the formation of a New Urethra. By M. RICORD. (*Bulletin de l'Academie Royale de Medecine*, April 1843.)—M. Ricord presented to the Academy of Medicine, on the 7th March, a man who had been operated on for the restoration of the urinary canal on the 27th of January. At this time he made water freely by the new canal, which was of sufficient size to admit bougies of a large diameter.

A phagedenic chancre had destroyed the urethral canal for the whole length of the *corpora cavernosa*, as well as the greater portion of the skin of the penis, so that about three-fourths of the circumference of the *corpora cavernosa*, as well as the longitudinal groove, indicating the site of the urethra, were alone covered by a thin cicatrix. The urine escaped from the perineum by an aperture concealed by the skin of the scrotum. M. Ricord thought that a new urethral canal might be formed between the *corpora cavernosa* and the thin cicatrix, which covered the groove between them, and he effected it in the following manner.

A slender flattened trocar, with a lance-shaped point, was introduced into the *meatus urinarius*, and its point pushed into the cellular tissue, which lies between the *corpora cavernosa*. It was carefully pushed on in the direction of the urethra, taking care not to injure the thin cicatrix till it arrived within about half-an inch of the perineal aperture, from which

the urine escaped. A gorgemet was introduced by this aperture, to the depth of about half-an inch, so as to form a continuous canal with that which the trocar had made. After this operation, which did not produce very severe pain, the perforating instrument was withdrawn, and a silver canula introduced, and within two hours after the operation the urine came freely away through the catheter. Cloths dipped in cold water were the only dressings used. Very little swelling or inflammatory action occurred. The catheter was replaced on the fifth day by a guin elastic sound, and since that time their diameter has been gradually enlarged, so as to bring the new urethra to proper dimensions.

Statistics of Strangulated Hernia treated at Wurtzbourg from 1816 to 1842. By M. TEXTOR. (*Revue Medico-Chirurgicale de Paris*, January 1843.)—The number of cases of strangulated hernia treated from 1816 to 1842 was 172. Of these, 98 were inguinal; 71 crural; and 3 umbilical. Of these two died before they were treated by taxis or operation. Of those treated by the taxis, 103 were cured, and 9 died. Of those subjected to an operation, 32 were cured, and 24 died. Of the 71 crural hernia, 65 occurred in women, and only 6 in men. Of the 98 inguinal hernia, only 13 occurred in women, but 85 in men. It is stated that the average mortality of operations for strangulated hernia at Paris is 4 out of every 7 cases. At Wurtzbourg, it was only 3 out of every 7.

TOXICOLOGY.

Toxicological effects of Sulphate of Quinine. By M. MELIER. (*Comptes Rendus des Seances de l'Academie des Sciences*).—M. Melier read a memoir to the Academy, in which he gave an account of some experiments of Magendie on the effects of poisonous doses of sulphate of quinine. Dogs were poisoned with this substance, and on dissection distinct fluidity of the blood was observed, and morbid engorgement of the parenchyma of the lungs. M. Melier, therefore, cautions against administering the large doses which it has been the practice of late to do, and urges its more cautious employment.

A Plate of Copper the best test for the presence of Arsenic. By HUGO REINSCH. (*Repertorium für die Pharmacie*, Vol. xxvii. p. 313.)—The process consists in acidulating, by means of hydrochloric acid, the liquors suspected to contain arsenic, and then boiling them with a plate of polished copper. If any arsenic is present the copper becomes covered with a layer of an iron grey colour. The precipitation of arsenic is so complete by this means that the apparatus of Marsh cannot detect the slightest traces of the arsenic in a liquor deprived in this manner of the poison.

Besides the precious metals, which are easily distinguished from metallic arsenic by their particular colour or lustre, bismuth and antimony are the only ones which are precipitated in this manner by this process. Bismuth, however, is always precipitated in a crystalline form, and antimony constantly covers the copper with a pellicle of a metallic violet colour if the solution be weak, but of a whitish grey if the solution be concentrated.

When the phosphoric, sulphuric, or acetic acids contain arsenic, and they are boiled with metallic copper, it retains its lustre; an aqueous solution of arsenic has also no action on copper; but if, while the liquor is still hot, a few drops of hydrochloric acid be let fall on the copper, it immediately becomes covered with the peculiar iron grey pellicle of arsenic. The action of the copper is quite distinct in a solution which contains only a two millionth part of arsenic, i. e. a half grain of arsenic in one million grains of fluid.

To ascertain whether the metal plates exhibited equal action when the arsenic was mixed with food, M. Reinsch boiled rather less than half a

grain of arsenic with a soup made of potatoes, milk, and meat. He afterwards digested the whole with pure hydrochloric acid; heated the liquor to ebullition, filtered it, and subjected the filtered liquor to the action of polished plates of copper. The surface of the plates immediately became covered with the characteristic film of arsenic. M. Reinech remarks that his plan seems to be susceptible of the same applications as those of Marsh, without being subject to the same inconveniences. Thus it never can yield false stains resulting from organic matter, or from arsenic in the zinc employed; and is capable of more immediate application in all judicial cases than any other procedure. All that is necessary in this case is to wash out the contents of the stomach and intestines with dilute hydrochloric acid, boil, filter, and immerse the plates of copper.

State of the Urinary Secretion in cases of Poisoning by Arsenic. By M. DELAFOND. (*Bulletin de l'Academie Royale de Medecine*, March 1843.)—M. Delafond made a number of careful experiments on horses and dogs, to ascertain whether the urinary secretion was arrested during the poisonous action of arsenic, or continued to go on. After keeping the animals without food for some hours, he employed a particular apparatus to collect the whole urine which was passed in twenty-four hours; and after ascertaining this point he administered a poisonous dose of arsenic, and still keeping the animal starving, collected the urine. In every case he found that a notable quantity of urine continued to be secreted, even when the poison killed the animal within the hour; but that in most cases the quantity was less than what it was when the animal was healthy. In every case the urine was loaded with arsenic. These experiments were also repeated before a Commission of the Academy of Medicine, and found by them to be correct, as stated by Delafond. This, therefore, sets at rest the question which has been agitated between Orfila and MM. Flandin and Danger, as to whether the urinary secretion was suppressed in cases of acute poisoning by arsenic. Orfila maintaining that it was not, and MM. Flandin and Danger that it was.

MISCELLANEOUS.

Medical Graduations at Edinburgh.—On the 1st of August 1843, the Senatus Academicus of the University of Edinburgh conferred the Degree of Doctor of Medicine on the following gentlemen, in number ninety-one, after having gone through the appointed examinations, and defended publicly their Inaugural Dissertations.

OF SCOTLAND.

James Bramwell, on Iritis.
John Traill U. Bremner, on Ulcers.
Robert Ebenezer Brown, on Sleep.
William Crawford Brown, on Tic Douloureux.
William Murdoch Burn, on the Use of the Cautery in Surgical Diseases.
James Craigie, on the Anatomy of the Inguinal Canal.
James L. Crawford, on Pleuritis.
Henry Fisher, on Jaundice.
Andrew Fleming, on Arsenious Acid and its Poisonous Effects.
James Gardiner, on the Signs and Symptoms of Pregnancy.

Charles Gibson, on Inguinal Hernia.
William Irving, on Pericarditis.
James Irving, on the general and special Circulation of the Sap in Vegetables.
William Smellie Johnstone, on Diseases of the Spinal Chord, their diagnosis and treatment.
Joseph William Turner Johnstone, on the Treatment of the various morbid conditions protracting the first and second stages of Labour, rendering it laborious.
William Mensies, on the Blood.
William Robertson Murray, on Acute Bronchitis.
Patrick M. Mackenzie, on Croup.

- John Maclean, on the Signs of Pregnancy.
 Charles Nelson, on the Human and Comparative Anatomy of the Cuticle and its appendages.
 Alexander Paterson, on Syphilis.
 James Potter, on Varix.
 Henry Reid, a statistical inquiry into certain details connected with the question of Amputation.
 Thomas Houston Rutherford, on Delirium Tremens.
 George Smith, on the Epigenesis, &c., of the Human Embryo.
 Charles Stewart, on Carcinoma.
 Ludovic Hay Thatcher, on Cynanche Trachealis.
 David Purdie Thomson, on Spontaneous Mortification.
 William Tibbets, on Dropsy.
 Francis Walker Turnbull, on Croup.
 Thomas Walker, on Hæmoptysis.
 John Anderson Wight, on the Hygiene of Infancy.
 James A. Wishart, on Cataract.
- FROM ENGLAND.
- William Axe, on Iritis.
 Edwin Swinfen Bellyse, on Acute Rheumatism.
 Henry Bidwell, on Hooping-Cough.
 Martin Burnup, on Scrofula.
 Thomas Chater, on Tetanus.
 James Clark, on Inflammation.
 William Davies, on the Nature of Continued Fever.
 George F. Easton, on Dysentery.
 Augustus Hardy Godby, on Consumption.
 Charles Vaughan Grinfield, on the morbid effects of Loss of Blood, and on Blood-letting as a remedial agent.
 Richard Edmund Brain Horniblow, on Strychnos Nux Vomica, and its Alkaloids.
 George Johnson, on the Mechanism of Natural Labour.
 William Kebbells, on Uterine Hæmorrhage.
 Thomas Lindley Kemp, on the causes of Continued Fever.
 Charles H. Kingdon, on Dyspepsia.
 William Leapingwell, on Rubella.
 Joseph Mayor, on the variations which occur in the proportions of Urea and Uric Acid in the urine, in certain cases of disease.
 Edward Frank Mercy, on Malaria.
- Alfred Parr, on the Pathological causes which protract the first stage of Labour.
 Spencer Pratt, on Gout.
 William Robertson, on Puerperal Mania.
 Robert Slack, on the Anatomy and Physiology of the Human Ear.
 John Smith, on Tubercular Consumption.
 Samuel Turrell, on Jaundice.
 Edwin Thorne Wait, on the Physiological and Therapeutic Actions of Cinchona.
 John Watts, on the Perforation of the Intestines.
 Philip Henry Williams, on the Nature and Objects of Medical Science, and the Principles upon which its Study and Practice ought to be founded.
 George Wilkin, on Inflammation.
 Theodore Francis Wood, on Scrofula.
 George Woodman, on Gonorrhœa.
 Robert William Wynne, on Scurvy.
- FROM IRELAND.
- John McCance Blizard, on Pneumonia.
 Matthew Henry Braddell on the Origin of the Entozoa.
 John James Clifford, on the Liver.
 William James Furlong, on Fracture and the Reparation of Bone.
 Thomas Henry Gillman, on Enteritis.
 James Goodshaw, on Scarlatina.
 Henry Haswell Head, on the extent to which several forms of Mental Alienation affect man's freedom of action.
 Martin Shine Lawlor, on Scrofula.
 William O'Neill, on the Pathological Anatomy of Varix.
 James Roche, on Intestinal Worms.
 Robert Henry Russell, on Acute Pneumonia.
 George Simpson, on Hepatitis.
- FROM POLAND.
- Dionysius Wielobycki, on Plica Polonica.
- FROM JAMAICA.
- John Bell, on Apoplexy.
 William Scott, on Cerebral Dropsy.
 John Thomson, on the Properties of Sulphur and some of its Compounds, with their Relation to Medicine and Medical Jurisprudence.

FROM BUENOS AYRES.

Robert Kendall Fair, on De Necrosis Ossium.

FROM NOVA SCOTIA.

Charles Tupper, on the Mechanism and Management of Parturition, illustrated by a Report of 116 Cases.

FROM GENOA.

Francis Fothergill, on the Causes of the Circulation of the Blood.

FROM THE EAST INDIES.

William W. Heude, on Peritonitis.
William Fullarton Mactier, on the Induction of Premature Labour.

FROM NEW BRUNSWICK.

Martin Hunter Peters, on Empyema with Pneumothorax.

FROM ST HELENA.

Walter Simpson, in what cases of Surgical Disease is the exhibition of Mercury, as a remedial agent, imperative, expedient, or warrantable?

FROM THE ISLAND OF BERMUDA.

St George Wade Tucker, on the Catamenia.

FROM THE ISLAND OF ST VINCENT.

Robert Porter Sprott, on Colic and Ileus; its Pathology and Treatment.

FROM BRAZIL.

Vicent J. Wanderley on Neuralgia.

FROM THE ISLAND OF ANTIGUA.

William Aug. Worseley, on Yellow Fever.

Surgeons' Hall, Edinburgh, 1st September 1843.—Since 31st August 1842, the following gentlemen have offered themselves as Candidates for the Diploma of the Royal College of Surgeons of Edinburgh, and after producing satisfactory evidence that they had completed the Course of Study prescribed by the College, have been admitted to Examination, and found fully qualified to practise the arts of Anatomy, Surgery, and Pharmacy, and have received Diplomas as Licentiates of the College accordingly.

Scotland.

Baxter, David
Black, Patrick
Bramwell, James
Bain, D. Stuart E.
Barrie, Andrew
Bremner, J. T. U.
Brown, Robert E.
Carruthers, James
Crosbie, J. H. Maxwell
Christie, Johnstone
Duncan, George
Fleming, Andrew
Gray, William Affleck
Gardiner, James
Grant, J. Mackintosh
Imlach, C. J. Ford
Irving, James
Johnstone, J. Dickson
Johnstone, W. Smellie
Menzies, Kenneth
Manford, F. Woodrow
Macfarlane, W. Joseph
Mitchell, William
Macleish, Alexander
Nelson, Charles
Nisbet, James A.

Philip, John

Pringle, Patrick W.
Rutherford, T. H.
Stewart, Charles
Syme, James
Somerville, T. H.
Stirton, James Archer
Small, John
Tait, William
Turnbull, F. Walker
Thomson, L. Ramsay
Thomson, James
Wishart, J. Alexander

England.

Binny, Charles
Hoskin, W. Thomas
Horniblow, George
Huish, Henry
Jones, F. Denbigh
Kingdon, Charles H.
Potts, T. B. William
Smith, John
Warnford, Charles F.
Wilkin, George
Woodman, George T.

Ireland.

Brice, George
Bleasby, Samuel
Charles, David Hughes
Godfrey, Henry Moore
Hayes, John James
Hyndman, James
Knox, William
M'Kay, Charles
Mackay, Charles
O'Neill, William
Ross, Arthur

Abroad.

Bowerbank, W. J. T.
Crerar, James
Collings, Joseph B. H.
Campbell, Arthur L. S.
Fehrszen, John Andrew
Fothergill, Francis
Fair, Robert Kendall
Mactier, William F.
Robertson, Henry F.
Scott, William
Simpson, Walter
Tucker, St George W.
Tupper, Charles
Thomson, John

Extracted from the Records of the Royal College by

JOHN SCOTT, Secy.

Coroner's Inquest at Beaumont near Carlisle ; alleged neglect or mismanagement of a case said to be disease of the hip-joint by mistaking it for rheumatism.—Our attention has been directed to the circumstances of a coroner's inquest, held at Beaumont, near Carlisle, on the body of a man named James Clark, and which has given rise to a singular discussion, with much diversity of sentiment among different persons there. The circumstances are briefly as follow.

James Clark, aged 50, an inhabitant of the village of Beaumont, was an out-patient of the Carlisle Infirmary in October 1842, and he was admitted into the hospital on the 14th December of the same year. The symptoms under which he was then labouring were, lameness in the leg and thigh of the left side, pain in the left knee and in the left hip. The lameness appeared to have been coming on for several years, according to one witness eight or ten years. On the pathological cause of these pains various opinions were entertained. Dr Barnes, the physician to the Carlisle Infirmary, states that, on the 9th of October, he ascribed them to rheumatism ; but a little after he states that he referred the case to the head of *morbus coxarius*, or disease of the hip-joint. At this time also there was no enlargement in the site of the joint, nor was there any evidence of the existence of matter. Dr Barnes also states that the patient was not then labouring under active inflammation of the hip-joint, but chronic inflammation of the synovial membrane. In a subsequent part of the examination Dr Barnes says that contraction of the ligaments is the *morbus coxarius* he meant in his book ; and this, he adds, was caused by articular rheumatism ; and that there was chronic inflammation of the ligaments about the joints, but not in the joint itself ; and that disease of the ligaments is what he meant by *morbus coxarius*.

For these symptoms a blister was first applied, and a mixture of spirits of turpentine was administered, internally we presume ; blood was drawn by cupping from the gluteal region on the 2d November ; a blister was again applied on the 23d November ; on the 7th December blood was drawn from the arm to twelve ounces, and ten grains of Dover's powder were given, followed by a dose of Epsom salts next morning. All these remedies appear to have been put in operation while James Clark was still an out-patient. On the 14th of December 1842, he became an in-patient. After this period no clear account is given of the treatment pursued or the remedies employed. The warm bath was also used twice. The patient was allowed to move about the ward during his residence in the hospital. On the 11th January 1843 he was dismissed according to one statement, relieved ; according to another much the same.

After this no distinct account of the man's state of health is given. It appears, however, that on Easter Sunday, which was the 16th of April, 1843, Mr Hodgson, surgeon in Carlisle, saw Clark coming from church ; and as he called Mr Hodgson, the latter stopped, and was then informed by Clark that he had been under the doctors of the Infirmary for a long time ; that they had done him no good, and he was becoming rapidly worse ; and that he would be glad, if Mr Hodgson or any of his medical friends could do anything for him. Mr Hodgson told him that he was afraid that his disorder was something worse than rheumatism, and that he would either come over or send some of his friends to examine him thoroughly.

Accordingly, on the 27th of April 1843, he was visited by Mr Thomas Elliot, surgeon, and Dr Jackson, and, as we are led to understand, by Dr James and Mr John Hodgson, surgeon ; and at this time the left limb was found to be one inch and a-half shorter than the right, and there was a large collection of fluid (purulent matter it is supposed) in the groin, extending round the outer side and half way down the thigh. It appears also from subsequent examination, not after death, that consecutive dislocation of the head of the thigh bone had taken place.

These gentlemen proposed to open the abscess ; and, accordingly, a punc-

ture was made to prevent the matter, it is added, from diffusing itself, and matter was evacuated. They directed the limb also to be kept immovable in a splint; and in two or three days after they returned and inserted a seton in the groin in order to relieve pain. He could not bear the pressure of the splint, which was removed. The man continued to grow daily weaker. Of his state we have no detailed account; but are informed, that in the beginning of August, he was in an extremely feeble condition, and death took place on Friday the 28th of August as we infer. (It is stated in the Carlisle Journal of the 2d September that he died on Friday last.)

It was suggested that a coroner's inquest ought to be held to ascertain the cause of death, we presume; and an inquest was accordingly summoned on Monday morning the 28th of August 1843.

After a long inquiry and the examination of many witnesses, viz. Dr Barnes, Mr Page, and Mr Burch, as connected with the Infirmary, and Mr T. Elliot, Dr W. Jackson, Mr Hodgson, Dr James, physicians or surgeons in Carlisle, and Dr Lonsdale, physician in Edinburgh, the coroner concluded his charge to the jury by presenting to them the following queries, to which he requested them to give written answers.

1. What was the cause of death? 2. What was the particular disease, its name and situation? 3. Was the treatment adopted during the time he was an out-patient, and afterwards an in-patient of the Infirmary correct, and duly and attentively administered? 4. If not, it will be your special duty to determine in what particular. 5. Was such inattention or error in any way contributing to his death? Was it gross inattention or ignorance such as might happen in the hands of men of ordinary care and skill? The jury consulted two hours and a-half, and returned the general verdict, "that the deceased James Clark did depart this life by the visitation of God in a natural way of *morbus coxarius*." In answering the special questions, they gave a unanimous answer to the first, that it was a disease of the hip-joint. To the second the answer, not unanimous, was that it was rheumatism and diseased hip-joint. To the third question the majority were of opinion that "the deceased was properly treated." But the others declined giving an answer.

We have been informed in more ways than one that it is expected that we should give our opinion on the merits of the case. The difficulty lies not so much in saying whether the treatment was proper or not, and whether all proper treatment was adopted and none neglected, as involving ourselves in a question where it is manifest, that party feelings were most improperly and, we think, not creditably allowed to interfere.

First, the opinion of Dr Barnes as to the nature of the case is confused and at variance with itself. The disease was rheumatism and it was *morbus coxarius*. This last is defined to mean contraction of the ligaments, and chronic inflammation of the ligaments. This is not the usual idea of *morbus coxarius*, which is known to consist in chronic inflammation affecting the synovial membrane and the interarticular ligaments, and proceeding commonly to the destruction of those ligaments, the interarticular cartilage, ulceration of the cartilages, and caries of the bone itself. At another part he admits that there was chronic inflammation of the synovial membrane.

As to the question whether James Clark was labouring under hip-joint disease or mere ischio-gluteal rheumatism at the time he was in the Infirmary, that cannot now be positively determined. It is merely rendered highly probable by what took place afterwards.

2. The treatment in the Infirmary was, to a certain extent, good, but scarcely sufficiently energetic, if it be inferred that inflammation was going on within the joint. In that case cupping ought to have been performed several times, and either an issue ought to have been established, or the actual or the potential cautery ought to have been applied freely and actively, while the limb should have been kept at perfect rest.

All these means, however, might have been used very actively, and yet the disease might not have terminated otherwise. Disease of the hip-joint is more common in young persons than in adults; and it is luckily more curable in the former than in the latter class of patients. But every experienced surgeon knows, that many cases of hip-joint disease, that are recognized early and treated actively, proceed, notwithstanding, to disorganization of the joint and bring the patient to the grave. Much more is it likely, that in a man of fifty like Clark, in whom, if this were the disease from the first, it must have been coming on long before he came under treatment,—no treatment could be available, and the disease would proceed uncontrolled to the usual termination.

3. Regarding another point, whether suppuration within the joint could have taken place in the time between the 11th of January and the 27th of April, it would be rash to give any opinion. We are bound to admit, from the statement of Dr Barnes and Mr Page, that there were no indications of the formation of matter previous to the 11th of January. Yet we have unfortunately no very distinct proofs of this, and it is incidentally said that the man had symptoms of fever, which, however, were not severe.

On this point Mr Elliot and Dr Jackson seem to have no doubts. They maintain that it is scarcely possible that matter must have been formed between the 11th January and the 27th of April. Mr Hodgson speaks differently. "I never said there was matter formed in the joint previous to his leaving the Infirmary."

But here is another difficulty. From the want of regular reports of the progress of the case, it is quite impossible to arrive at positive inferences. Had short notes of the leading symptoms of the case been taken at first, and had its state been reported every week, or at convenient intervals, it is almost certain, that some more clear idea of the nature of the case might now have been formed. In this hospital, however, no journals are kept, —a practice which is good neither for physician nor patient.

4. Another point must strike every one as a great defect in the evidence in this case. There was no morbid examination of the joint. There is no clear and certain evidence that the matter came from the joint. It is merely highly probable that it did so.

5. The originating of the inquest, and the mode in which it was conducted, it is quite impossible to contemplate with agreeable feelings. We have been painfully taught that the profession of medicine is not what it was, or what it ought to be. But a more painful illustration of this truth has seldom been forced upon our knowledge than the present inquest shows. As there was no pathological inspection of the parts, it is not even pretended that this was the object or one of the objects of the inquiry. On the other hand, it appears too clearly in the evidence and by the testimony of several of the witnesses, that the great object was to prove that Dr Barnes, or the surgeon of the Infirmary, had committed a professional blunder, and that this was to be most industriously exposed to the public view. Dr Barnes we do not pretend to defend. Probably he committed an error in diagnosis; perhaps the treatment was not quite vigorous enough. But who is prepared to say that the termination might have been other than it was, supposing the diagnosis to have been from the first right, and the treatment accordingly? We infer that the medical gentlemen who appeared as witnesses congratulated themselves very much on the line of conduct they adopted; and we hope it will furnish a plentiful crop of those good fruits which they expect to spring from such proceedings. But they should remember that this is a game at which two parties can play, as soon they divest themselves of those feelings of mutual good will and charity with which they have always regarded each other. To do to others as you would wish them to do to you, is always a good rule for regulating conduct;

and no man ever departed from it without having good cause to regret it. Whoever agitated this question, and whoever appeared in evidence against Dr Barnes and his associate, there can be no doubt that not one of the medical practitioners in the same town ought to have allowed themselves to be placed in that interesting situation. If it were deemed requisite to institute an inquiry of this kind, these gentlemen should have been spared the pain of making themselves known in the manner in which they have; and the case ought to have been referred to a body of medical practitioners remote from the scene, and uninterested in the parties.

6. There appeared to be, however, no occasion or cause for such an inquiry. If it was required to elucidate the nature of the disease, or render certain what was doubtful, that could have been done by simple inspection of the parts. If a coroner's inquest, similar to the one lately held at Carlisle, were deemed requisite in every case of death, and if each inquest were conducted in the manner in which that one was, who could practise either medicine, or surgery in safety or with peace? What a happy contrivance it must prove for dividing the members of the medical profession, and making them hate each other more cordially than they have ever yet done! What an excellent engine of persecution and paltry annoyance it may be converted into! Indeed the world are under deep obligations to the Carlisle gentlemen for this new application of the coroner's inquest.

But we further maintain, that the whole investigation was a complete misapplication of the office and duty of the coroner, and that this functionary, in instituting the inquiry, did what he had no just authority to do. "The duty of the coroner consists principally in inquiring when any person is slain, or dies suddenly, or in prison, concerning the manner of his death."

Here no person was slain. It is not even pretended that the man died suddenly; for at the beginning of August he was known to be in an extremely feeble condition, and nothing but death was looked for the whole month of August. In the third place, the man had not died in prison, and, consequently, his death could not become the subject of inquest on that account. There was, in short, no ground whatever for making the death of James Clark the subject of a coroner's inquest.

The only inquiry that could be reasonably instituted was, whether it was a case of *mala praxis*; but in this view the inquiry ought to have been brought into an ordinary court of law, as a suit at the instance of the friends of the deceased.

But as if it were destined that every one concerned in this inquiry should proclaim his wisdom to the world, the coroner labours hard to acquire an unpleasant distinction.

Instead of acting the part of the impartial judge, dealing even-handed justice to both sides, he betrays, in no equivocal manner, a decided bias in favour of Mr Elliot, Dr Jackson, and their allies. Of his law we know nothing and give no opinion. But his judgment and his discretion it is impossible to approve.

7. It further turns out that the whole of this warfare owes its origin to the manner in which the medical officers of the infirmary were appointed. It appears that the governors are what is vulgarly called a close body; that Dr Barnes had interest enough with them, to get himself named physician, and then to obtain the appointment of surgeon for Mr Page. There was no open election. Of course this was a sin not to be forgiven, and hence the other medical practitioners have adopted this mode of testifying their sentiments and making the place uncomfortable. One of them, indeed, Dr James, declares in open court, that he regards it "as the proudest day of his life when he joined his medical brethren in opposing the principle adopted in the appointment of the medical officers of the Infirmary." The disposition is amiable. But it might be suggested that, while they make the

office of physician and surgeon to the hospital uncomfortable, the public will not fail to draw their own conclusions as to the motives by which these gentlemen are actuated.

The Sydenham Society.—Prospectus.—The Sydenham Society has been founded for the purpose of meeting certain acknowledged deficiencies in the diffusion of medical literature, which are not likely to be supplied by the efforts of individuals.

It will carry this object into effect by distributing among its members:—

1. Reprints of standard English medical works, which are rare and expensive.
2. Miscellaneous selections from the ancient and from the earlier modern authors, reprinted or translated.
3. Digests of the most important matters contained in old and voluminous authors, British and foreign, with occasional biographical and bibliographical notices.
4. Translations of the Greek and Latin medical authors, and of works in the Arabic and other Eastern languages, accompanied, when it is thought desirable, by the original text.
5. Translations of recent foreign works of merit.
6. Original works of great merit, which might be very valuable as books of reference, but which would not otherwise be published, from not being likely to have a remunerating sale,—such as classified bibliographies, and alphabetical indexes to periodical publications and other valuable voluminous works.

The society will consist of an unlimited number of members.

The subscription constituting a member is one guinea annually, for which he will be entitled to a copy of every work printed by the society, during the time of his subscription.

The subscriptions are to be paid in advance; and no member is responsible beyond the amount of his subscription.

All works published by the society will be selected by the council; and, previous to publication, will be subjected to their supervision.

The society will not commence its operations until the number of its members amounts to 500.

The works of the society will be printed for members only; on a uniform plan, and with a good legible type.

The society will be under the direction of a council of twenty-four members elected at the annual general meeting from the subscribers at large; and of this number eighteen only will be re-eligible for the following year.

The president and vice-presidents will also be elected annually.

As the expense of management will be very small, nearly the whole of the funds subscribed will be devoted to the publications; and as the proportionate cost of producing books decreases as the number of copies increases, it is anticipated that, when the society is fully organized, the annual supply of works to members will be considerable.

The great success that has attended other societies, established on similar principles, and with like objects,—as the Camden, the Parker, the Percy, &c.,* leaves no room for doubt as to the eventual prosperity of the Sydenham Society. It would indeed be strange, if medicine, which boasts of a literature more extensive than that of any other art or science, and of cultivators as numerous, zealous, and learned, as any other department of human knowledge, should fail in attaining an end which has been so speedily and so fully accomplished by the societies referred to, and by others embracing even less comprehensive objects.

The gentlemen named below, as constituting the Provisional Council, have undertaken the organization of the society, and will continue to act until its constitution and government are finally fixed at a general meeting of the members. They have great satisfaction in being able to lay before

* The present number of subscribers to the Parker Society for publishing theological works, exceeds 7000. The number of members in the Camden is limited to 1200, and that number has long been complete.

their medical brethren the names of the eminent individuals who have consented to act as provisional president and vice-presidents, and who have promised their zealous co-operation in carrying into effect the important objects of the society.

. As the number of copies printed of any work will be regulated by the number of members, gentlemen desirous of possessing all the Society's publications will see the necessity of giving in their names early.

Gentlemen desirous of becoming members are requested to forward their names to the provisional Secretary, W. G. Burroughs, Esq. at the Treasurer's, 31, George Street, Hanover Square, or to any member of the provisional council.

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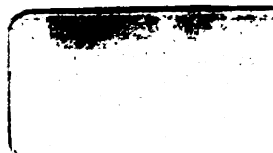
END OF VOLUME SIXTIETH.

No. CLVIII. will be published on the 1st of January 1844.

EDINBURGH: PRINTED BY STARK AND COMPANY, OLD ASSEMBLY CLOSE.

JUN 1969

WESBY





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